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BRITISH VETERINARY CODEX

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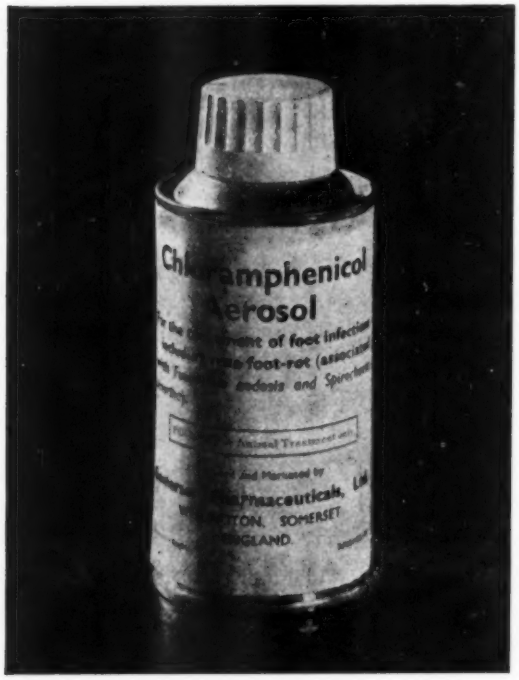

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The Annual Congress

THE seventy-sixth Annual Congress of the B.V.A. finds the Association in good heart. We are higher in numbers than ever before, united in our policies, and fortunate in the esteem of the community. There is work to be done on every hand, but in counting our blessings, as well we may, we find in them no cause for unction, but rather an inspiration to press forward with increased vigour.

By now members will have received the Congress handbook, containing the annual report. It is an encouraging document, and covers a range of subjects that might well have astonished our forebears. Our science was bound, of its very nature, to grow. The call in all parts of the world for more and better food, for the by-products of farm animals and for a rising standard of public health—even though in that matter we are not yet invited to take our full share—have made inevitable not only an increasing call on the services of the individual veterinarian, but have provided a challenge to the profession as such to increase its knowledge and to widen its horizons. The annual reports bears ample evidence that these things are being done, and that our Association is taking, as it should, a leading part in them.

In this connexion members will wish to acknowledge, with gratitude, the vast amount of work done on their behalf by standing committees, by the Council, and by the Officers. It is easy to take voluntary work for granted; but the acceptance of office, honour though it is, imposes heavy burdens and even material sacrifices, especially upon those in practice. The Presidency, for example, calls for three years of consecutive labour—as Junior vice President, as President, and as Senior-vice. Those in practice, working a seven day week, will understand just what three years in office demand; and the B.V.A. is fortunate that men of the highest ability are still willing to shoulder the onerous responsibilities which office entails in order to serve their colleagues.

With the installation of Mr. Hebeler, we shall have a West country President for the first time since 1898-99. The differences between then and now are striking indeed. In early August of the latter year, Mr. Bloye presided over the seventeenth annual meeting of the National Veterinary Association. The meeting lasted two days " and no sign of weariness was evident." About eighty members were present, and " never before has a meeting closed with more general expressions of perfect satisfaction." The ladies in particular were singled out, and appeared, indeed, to enjoy some of the natural advantages of Mlle. Brigitte Bardot, for THE RECORD noted that they " graced the reception *in a conspicuous manner*." They were, however, under firm masculine control, for they seem to have been excluded from the eating and drinking part of the banquet, but were later seated in a corner to which they " were admitted to listen to an excellent programme of music and song."

Apart from the emancipation of veterinary and all other ladies since those days, the Congress to which the members of the Lancashire Veterinary Association are acting as hosts promises to differ in other substantial particulars from that over which Mr. Bloye presided. Of note will be the fact that, while much time was given in 1899 to a discussion on bovine tuberculosis and the role of the profession in dealing with it, the profession is now looking to an immediate future when, through its own efforts in large part, the condition will be eradicated from these islands. Had that been our only achievement, which is far from being the case, we should have cause for satisfaction; but advances have been made all along the line to a degree and at a speed which would have " made Quintillian stare and gasp," and Congress week is a suitable time to reflect upon them. For it is a time of intellectual and professional refreshment; a time for exchanging ideas and for stimulating knowledge; a time for renewing old friendships and making new ones. In short, it is the best kind of tonic and our Lancashire hosts have spared no effort to assure its success and provide a most congenial week for everyone who visits the Isle of Man.

XUM

Neoplasia in Domesticated Animals: A Subject for Study in Practice, Abattoir, and Laboratory*

BY

E. COTCHIN

Department of Pathology, Royal Veterinary College, London

NEOPLASIA in domesticated animals is in many ways a very suitable subject for study, which carries the possibility of bearing good results not only for the patient, practitioner, and pathologist, but also, because of its importance in increasing our knowledge of cancer, for mankind in general. At the outset, I should make it clear that I am not suggesting nothing has been done in this field of study—the names of Feldman, Innes, and Jackson, for example, have only to be mentioned to dispel this idea—nor is it suggested that neoplasia is the only important aspect of veterinary pathology that should be investigated. Nevertheless, the subject is one in which interest is growing, particularly on the Continent and in America, and the study of animal tumours could in fact be developed quite extensively with very little extra effort if the informed co-operation of more practitioners were obtained. The chief aim of this address is, in fact, to try to enlist such co-operation. At this point, may I express my thanks to those Fellows of this Society who have been untiring in providing me with most useful material?

In discussing my subject to-night, I would like first of all to talk a little about some general aspects of the study of neoplasms in domesticated animals in relation to practice, abattoir and laboratory, and then to make some more specific comments on certain tumours which seem to be ripe for closer study within the limits of what is possible at present. Finally, if there is time, I would like to indulge in a little speculation on what might be done in developing the subject of comparative oncology if circumstances regarding money, equipment, and staff were entirely favourable.

1. What is the rôle of the practitioner in the study of neoplasms in animals?

Without exaggerating the clinical importance of neoplasms in domesticated animals, it is true to say that in small-animal practice the provision of a diagnosis and prognosis in relation to tumours is of considerable value—the incidence of tumours in dogs and cats has been estimated to be of the order of 5 and 1 per cent. respectively—and in large-animal practice, too, although tumours are less common, economic considerations mean that a diagnosis of malignancy (or otherwise) is quite often worth making. A lot can be done by clinical observations, but a rational prognosis must generally also be based on a histo-pathological examination. As the general public is becoming "cancer research conscious", it can be expected that the request for pathological diagnosis will be made more and more often by owners.

The practitioner has a very important place in this study of animal tumours. He will, of course, be occupied partly in collecting proper information and supplying proper material for the pathologist, but he will also be concerned with the clinical, surgical, and epidemiological aspects of the problem. Thus, he will be employed in acquainting himself with the growing information about the tumours that actually occur in animals, while developing surgical techniques, and trying out other hopeful therapeutic measures—the work of Knight, Dalton, and Mitchell in the field of X-ray therapy might be mentioned here—and he will also be gradually forming a reliable picture of the frequency and manner in which the animals in his practice are affected with cancer. Little is known about geographical variations in incidence of tumours of animals in this country, although these may give very valuable clues to the aetiology of cancers, and here the help of the observant and recording clinician is indispensable.

If the laboratory is to make the most of the material it receives from the practitioner, it is essential that each specimen of neoplasm should be properly chosen, properly fixed, and expeditiously and safely despatched. It must also be accompanied by a detailed clinical note. An attempt should invariably be made to follow-up every case in which a neoplasm has been removed operatively, and to ensure that a proper *post-mortem* examination is made of every animal which has, or has ever had, a neoplasm.

In general, it is best if the whole tumour can be sent for examination. A thin representative portion (or portions—some tumours vary widely in structure in different parts) should be placed as soon after removal as possible in a large bulk of fixative. For most purposes, 10 per cent. formalin is best (commercial formalin diluted with 9 volumes of water). The rest of the tumour, according to size, can be sent in more fixative, or wrapped in cloth or cotton-wool soaked in formalin. If it is possible to get the specimen to the laboratory quickly (*e.g.* by next morning at latest), it can often be left unfixed, and it will then have the advantage of showing the fresh, unfixed appearance of the tumour. The edge of the tumour is of special interest to the pathologist.

To provide information about the tumours sent in to the College for examination, a simple duplicated form is filled in by the veterinary surgeon (these forms are available on request). At present, we are prepared to examine without charge neoplasms that are submitted in this way, but we do rely on the

* Presidential address to the Central Veterinary Society, May 1st, 1958.

practitioner to ensure a proper post-operative check on the cases, as only in this way can histological diagnoses be tested. If this involves the veterinary surgeon and the owner in taking a little trouble, this could be looked on as a sort of payment for the histological diagnosis.

It is essential that all the information asked for on the form should be given, and in certain instances still more details are needed. The various headings (of which certain aspects and implications will be discussed) are not chosen at random, but are put in to elicit information which will be of value in helping diagnosis and also in providing a fuller picture of neoplasia in domesticated animals.

Reference Name or Number

This serves to identify the animal when the report is sent, and may identify an animal after an owner has moved.

Daybook Number

This (College) daybook number is applied to all reports, sections, photographs, X-rays, and so on that refer to the particular tumour. It should always be quoted in subsequent letters, *e.g.*, those giving post-operative histories.

Species

The species difference in incidence is one of the most striking features of tumours in animals, and this feature, if rightly understood, would solve many cancer problems (Schlumberger, 1957). We should of course remember in this connexion that many species of animals do not usually live out their life-span, and that they differ in phylogenetic ancestry, in their mode of life, *e.g.* whether herbivores or carnivores, in their management, in their degree of domestication in its narrow sense, and so on. From a consideration of the important malignant tumours of the various domesticated mammals, it is useful to consider that these tumours are of two main types, according to their species incidence—that is, "wide range" or "narrow range". In domesticated animals, for example, lymphosarcoma is an excellent example of a "wide-range" tumour, while carcinoma of the oesophagus is a "narrow-range" tumour, being practically confined to cats. It is useful to try to extend our information in this direction, by examining tumours from as many species as possible, because these similarities and differences in incidence may indicate where a search should be made for possible actual causes of cancer to which the different species are exposed. It can safely be said that every cancer has a cause, and, as a working hypothesis, it is possible that "like cancers have like causes, and unlike cancers have unlike causes". The relationship of smoking to lung cancer in man, and the comparative rarity of lung cancer in animals, is a case in point.

Man, it may be said in passing, does show many peculiarities of site incidence of cancer. Thus, in England and Wales, in 1950-4, the common sites for cancer were (in males) lung, stomach, intestine, rectum, and prostate, and, in females, breast, stomach, intestine, uterus, and ovary. As another example, of the 20 cancers which form over 90 per cent. of a total of 6,072 cancers at the Los Angeles County Hospital, as listed by Steiner (1954, p. 25, Table III), only 3 (malignant lymphatic tumours, carcinoma of the mammary gland, and malignant bone tumours) can be said to be of any great importance in domesticated animals, while of the remaining 54 cancers listed, 3 are of considerable importance in animals—malignant melanomas, carcinoma of the tonsils, and tumours of the testis. Again a tumour that is very common in cattle in some parts of the world, carcinoma of the conjunctiva, does not figure in Steiner's list.

Age

Whilst most tumours tend to be seen in animals that are advancing in years, certain tumours do affect younger animals, *e.g.* lymphosarcoma in cattle, rib sarcomas in dogs. We cannot, however, assume that youth and sarcoma formation are necessarily related, for, although in man, sarcomas, which form a minority of tumours, tend to occur in younger rather than in older people, in the cat at any rate sarcomas form a majority of malignant tumours, even in old animals. We need a lot more information about the age distribution of tumours in animals, *e.g.* of alimentary cancer in cats. In passing, we might refer to the simple experiment suggested by Dobberstein (1951)—to keep a herd of 30 pigs until they die of old age.

Sex

Domesticated animals often offer a wider number of sexes than the usual human population if we consider castrated males and castrated females as third and fourth sexes.

Apart from such obvious cases as mammary tumours, there are some tumours of animals that are known to show a sex incidence—*e.g.* cancer of the upper alimentary tract in male cats, and this aspect should be pursued, as it might point to methods of treatment or of alleviation, as with Smythe's use of stilboestrol for the circumanal adenoma, which occurs predominantly in old male dogs.

Breed

It is helpful if mongrels and cross-breds are ascribed to their probable breeds of origin if possible. There are, of course, examples of breed incidence of tumours in dogs, but still more may exist which should be uncovered.

Site

This should be exact anatomically, and even precise in reference to particular organs—*e.g.* "superficial" or "deep" in relation to mammary tumours. It is not sufficient to say merely "skin" or "testis". Some words are insufficiently precise or may be ambiguous, *e.g.* abdomen, cryptorchid, ear.

Some tumours have quite a restricted or localised site of origin, *e.g.* bone tumours of dogs, tongue cancers of cats, which makes a histological study of their origin and development feasible.

XUM

Clinical Features

"First Noted"

This will, perhaps, be most accurate in respect of tumour recurrences, as the time of operation provides a point of departure in estimating the rate of growth. Exact measurements are desirable. While rapid growth may merely indicate haemorrhage into the tumour, or the expansion of a cyst, it is generally a bad sign.

"Present Appearance"

It is not sufficient to write merely "as specimen"—colours change with fixation, relationships are lost or disturbed. In assessing clinical malignancy, ulceration, adhesion to underlying or overlying or neighbouring tissues, ill-defined borders, and so on, are all guides.

"Local Lymph Node"

Sometimes lymphatic pathways utilised in tumour dissemination are less restricted than normally would be expected on strict anatomical grounds, *e.g.* the spread of mammary neoplasms from the posterior mamma to the axillary node. Enlargement of a regional lymph node is often, but not necessarily, a bad sign. It may, in fact, be the first sign of anything wrong, *e.g.* the great enlargement of the superior cervical lymph node that may indicate a clinically silent tonsillar carcinoma of a dog.

"Radiograph"

A radiograph of the lungs may help detect pulmonary metastasis before clinical signs develop. Secondary tumours in bones are not often seen in animals, but they do occur and may be confusing: thus, a bone-marrow metastasis of a carcinoma of a dog's tonsil was thought clinically to be a primary tumour of the femur.

General Clinical Condition

While animals with metastases may be in surprisingly good condition, wasting would be a bad sign, as would the development of a cough which might indicate pulmonary metastases.

Clinical Diagnosis and Prognosis

It is helpful to indicate whether the clinical signs point to malignancy or not.

2. What is the rôle of the abattoir veterinary surgeon?

We need figures of the kind given by American workers, who lead in this aspect of the study of animal tumours. All tumours should be looked upon as potentially valuable clues to the solution of the cancer problem, and it might be considered a point of duty that no tumour encountered in meat inspection or in the knacker's yard should be disposed of unexamined. A lot of pathological material in general is wasted in abattoirs and more should be done to make this material available for study.

3. What is the rôle of the pathologist?

This will not be restricted to careful recording, detailed histological study, and the provision of a helpful diagnosis and prognosis, although these are of course very important. At present, most studies of animal tumours are made by histopathologists, but one may expect that cytologists, histochemists, biochemists, and others will become increasingly involved. As some of you may have gathered, the study of animal neoplasms has for me an increasingly absorbing interest, for which I think the following considerations are responsible: it is not a static study, but a developing one, in which experience most certainly teaches, and is therefore welcomed. The pathologist cannot, in fact, have too much material to examine, provided he has time to study it and (importantly) to record it: here I might venture to express the hope that veterinary pathologists in all parts of the world will publish surveys of the material they have examined. Again, the study is an interesting one not only in itself but because it is a focal one which raises problems in the fields of embryology, physiology, and so on, as will be indicated later. Finally, the study is of relevance to cancer research in general: it is a fact to be regretted that the spontaneous tumours of domestic animals have not been sufficiently studied by cancer research workers. Theories about the nature of cancer cannot be expected to be thoroughly well-founded unless they are promulgated by those who have a profound knowledge of cancer as it occurs in animals as well as in man.

Neoplasms that Warrant Particular Study

1. Lymphosarcoma, Including Lymphatic Leukosis

We need first to know more about the incidence and epidemiology of lymphatic leukosis in cattle. In this country, the affected animals we have examined have been notably young, most of them being under 2 years of age. The virus origin of this condition needs study, as well as possible treatment. It is perhaps of interest that last year we were able to examine twin calves that were actually born with lymphatic leukosis: the cow is in calf to the same bull, and we await events.

My colleague, Mr. Irfan, has been making a very extensive study of the blood picture of the dog, and he has concluded that, in general, impression smears or histological sections from lymph node biopsy specimens are more valuable than blood examination in confirming a diagnosis of lymphatic leukosis (or "pseudo-Hodgkin's disease"), although the demonstration of the presence of lymphoblasts in the blood is positively diagnostic. A study of therapeutic as well as diagnostic features of this disease in dogs is needed, and its possible relation to intestinal lymphosarcoma should be clarified. Similar observations should be made on the important and common condition of lymphosarcoma in cats.

2. Melanomas

Studies have been made of the histological structure of melanomas in dogs, and these indicate a need to study the embryological origin of the melanoblast. We need to know more of the fate of the benign fibrous and cellular melanomas of the skin of the dog—thus, do they tend to become malignant? Such clinical and histological studies of structure and

origin need to be extended to melanomas of horses and cattle. My colleague, Mr. J. E. T. Jones, is actively interested in the melanomas of grey and other horses, and we should welcome material from such cases.

We need also to develop means of estimating malignancy to supplement histological examination: the detection of melanogen in urine by Thormählen's test as a guide to malignancy is worth trying, and so every melanoma submitted for examination should be accompanied by a sample of the affected animal's urine.

The radiosensitivity of malignant melanomas needs further exploration.

3. Alimentary Cancer in the Dog and Cat

We need to know more about the geographical distribution of squamous-cell carcinoma of the tonsil of the dog, and of the tongue or oesophagus of the cat, which seem particularly important in the London area. It is possible that these tumours might be related to aerial contamination in smoky districts, and it would be of interest if we could plot on a map all places in which such carcinomas have been identified. The possibility, too, that some dietary constituent is responsible for upper alimentary tract cancer in cats should be tested. A study of the dog's tonsil, and of the cat's tongue and oesophagus, for pre-cancerous changes would be feasible, as these tumours are quite restricted in their site of development. Their radiosensitivity should be further investigated.

4. Mammary Tumours in the Dog

One particular point to be investigated is the relationship that has been said to occur between infrequent or absent pregnancies and the development of mammary tumours. My colleague, Mr. Frost, is making a survey of the breeding and oestral histories of bitches with and without mammary tumours, and it would be helpful if others could collect similar information. The idea is that repeated non-fertile seasons, accompanied perhaps by "false" lactation, may result in hyperplasia or neoplasia. The effects of hyperprogesteronism should be tested in small laboratory animals.

Since in many mammary neoplasms of the bitch there appears to be a neoplastic proliferation of the myoepithelium, the embryology and function of this type of cell should be further investigated.

We also badly need a simple but reliable method of determining sex hormone levels in small samples of plasma or serum. If this were available, an investigation of the endocrinological status of bitches with and without mammary tumours would be facilitated.

5. Testis Tumours in Dogs

About half of the testis tumours of dogs that we have examined are Sertoli-cell tumours. These tumours may be accompanied by alopecia and feminisation, and not infrequently such tumours occur (as may other kinds of testis tumour) in ectopic testes. We need to study the relationship of tumour development to hormone status and to ectopia, and it would be of interest to examine all ectopic testes, whether neoplastic or not.

6. Carcinoma of the Glans Penis of Horses

The carcinogenic factor in horse smegma, presumed to be present from the experimental findings of Plaut and Kohn-Speyer, should be identified.

7. Bone Sarcoma in Dogs

Careful case histories are required to help to see whether trauma or dystrophic factors are involved in the origin of these tumours.

A Few Speculations

So far, the studies I have suggested are largely within present resources, but it is perhaps permissible to indulge in some speculations about what might be done in the way of study of animal tumours if financial and other factors were entirely favourable. It must, of course, not be forgotten that the welfare of the affected animal must be a paramount consideration.

Perhaps we could start off with a Registry of Animal Tumours, as was notably advocated by Innes. As I have written elsewhere (Cotchin, 1951) this "would be concerned with tumours of large as well as of small animals; standards of histological classification would be established, and the records of the clinical and pathological features of the different cases filed and indexed, along with actual specimens, coloured photographs, paraffin blocks, sections, and so on. This Registry would be able to supply information and material to interested workers, whether veterinary or medical; further, records could be kept of any successful or unsuccessful therapeutic measures—surgical, radiological, or otherwise. . . ." Adequate secretarial and technical staff would be needed, and one early function of this Registry would be to publish an Atlas of Comparative Oncology. To this Registry, post-graduate workers would be attached—some would be working for a degree, others would be working as part-time students seconded from cancer research establishments, and others would be visitors from abroad. There would be adequate apparatus—microscopes of various specialised types, photographic apparatus, and so on. Various histo-chemical, embryological, endocrinological, and other biological studies would be carried out.

Whether the subject of neoplasms in domesticated animals would carry the weight of such an apparatus of investigation as this is a matter for critical assessment by someone less near to the subject than the present speaker. What is certain is that even if such an extended study produced nothing of value from the point of view of advancing the solution of the major problems of cancer (and this would seem a very pessimistic idea), the study would incidentally provide very many advances in our knowledge of comparative pathology.

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XUM

Symposium

H. Burrow : A. R. Jennings : D. D. Lawson : L. C. Vaughan

Presented to a general meeting of the Association of Veterinary Teachers and Research Workers in Liverpool, April 2nd, 1958

Three Points in a Teaching Triangle

BY

H. BURROW

Royal Veterinary College, Streatley, Berks.

THE subject which it is my privilege to introduce to-day must seem a little commonplace, after the exciting and erudite discussions with which we have been entertained and educated during this General Meeting. Nevertheless the fact must not be overlooked that the research workers and practitioners of to-morrow are the students of to-day, and that on our selection of students, and indeed their teachers and their examiners, the future supply of research workers and practitioners must be profoundly influenced.

I have referred to this as a triangle because the shape of a triangle, unlike that of a circle, could be altered, depending on the relation to each other of the three points or angles. From this you will have gathered that I propose to draw your attention to the essential factors as I see them of my three points of this teaching triangle—students, teachers and examiners.

Students

The selection of students which appears to be practised in all our Veterinary Schools is one of the most important duties which an academic staff have to perform. On the quality and type of raw material much of the success or otherwise of the final product must inevitably depend. This selection can be based on standards of general education but under present-day methods of general education in which large classes of pupils are dealt with by one master, while the "up and coming boy" may be able to obtain a satisfactory general education, the less brilliant, though perhaps basically sounder, boy may find it difficult to make the grade. It is in the very nature of things that the boy or girl whose interests are of the "outdoor" kind, including the care of animals, is very often the least able to assimilate factual information and disgorge it to the satisfaction of his less "earthy" examiners. You may no doubt retort that if the future profession is to increase in social status and if it is to cope with ever-increasing problems which arise in a world half crazy with success and bewildered by its vast discoveries, the standard basic education of new entrants to veterinary schools must be correspondingly elevated. My reply would be that in these circumstances it is more than ever essential that the student should be endowed with good common sense, a quality which is by no means always accompanied by scholastic brilliance, indeed one very often finds that the two are antagonistic to each other.

There was a time when the large majority of students entering veterinary schools were sons of farmers or veterinary surgeons or at least had some more than passing connection with the animal-owning section of the community. By this I mean not the person who kept a pet cat or dog but those who kept animals in numbers and could be rightly described as animal owners in more than a token manner. Nowadays one finds that the minority of students entering large schools have such a background. While one would not for a moment deny that there are many competent members of the veterinary profession in all its branches who have originated from sources unconnected with animals, a leavening of each student body by the admixture of an increased proportion of "earthy" animal-minded students could not fail to be of benefit to the whole student body. This is particularly so when we consider the small number of students who are nowadays interested in horses. The shortage of veterinary practitioners with special interest in horses and special aptitude for horse practice is attributable to the fact that this type of graduate is not developed in a veterinary school but is either born a horse lover or acquires the habit in his early youth long before he enters the veterinary college and, what is more, because of his mental make-up, he is unlikely to survive in the present fierce scholastic competition upon the results of which his acceptance as a veterinary student so often depends. The point I wish to make is that in the selection of students, background, common-sense outlook and an inherent interest in animals should be the deciding factor, and provided that a reasonable standard of general education has been attained by the prospective student pre-eminence in scholastic pursuits should not be allowed to influence the interviewing panel.

And what of the student himself? What does he ask of his teachers and his examiners? May I put it in the form of an address which I am sure that many a prospective student would like to deliver to his inquisitors?

"Sirs, I am an ordinary boy (or girl) with a more than passing interest in animals. I am happiest when I am tending and caring for them, I like to share their open-air existence and I see in them an honesty and beauty which I have not always seen in my fellow men. I see animals as living things and not as machines, and perhaps because of my

love of them I am close to them in my simplicity of outlook. I am not mentally brilliant otherwise I would choose as my career one more lucrative than the veterinary profession. I ask, Sirs, that you will judge me for my common sense and not for my brilliance, for my willingness to devote my life to the care of animals in all circumstances of time and weather and for my readiness to accept the physical risks which contact with animals entails. I ask above all that you will teach me so much of the science of veterinary medicine and surgery, and so much of the art as you may think combines with these sciences, as my average brain can understand and retain and I pray that above all you will refrain each of you, in his enthusiasm for the little empire of knowledge in which he reigns, from crowding into my mind and my memory more than they can absorb, thereby making my student days a mental nightmare and my post-graduate life a confused morass from which, in this life, I am never likely to emerge."

Teachers

Turning now to teachers, one might rightly say that good teachers in all subjects are born rather than made. Nevertheless, the inherent flair for teaching with which some people are born is developed in varying degrees in accordance with the experience which the teacher had gained and, what is more important, with the degree to which he has been able to "keep his feet on the ground."

Who make the better teachers; those who have joined the academic staff of a veterinary school soon after qualifying or those who have joined later in life, after they have had the corners knocked off them in the rough and-tumble of life in the outside world? The answer to this question is not easy to find, as much depends on the subject with which the individual teacher deals, and much also depends on the individual temperament of the teacher concerned. Looking at a teaching staff as a whole one would say that a combination of the two types of teacher is probably the ideal; those who have spent their complete lives in academic circles tend to maintain the academic background of the veterinary school while those who come into teaching later on in life bring with them a "breath of the fresh air of the country" and a practical outlook on what matters and what does not.

One point should be mentioned here, however, and that is that the present standards of salary and superannuation are not sufficiently attractive to draw into teaching veterinary surgeons with many years of clinical experience in the field. Particularly is this so when we look at the superannuation position of teaching staffs and of practitioners entering the teaching field in middle life. These would qualify for a very low rate of superannuation even if they continued in teaching up to a maximum retiring age of 67 years. It means therefore that teaching staffs are composed either of people who have entered academic life at a very early age, without the advantage of having a varied experience which only life in the outside world can give, or of those who are willing and able to enter academic life at a later age and enrich their teaching with their own experience gained in the hard school of competition. The latter must inevitably be persons with private means from which they can supplement their low standard of superannuation when the age of retirement arrives.

The question which must often raise itself in our minds is whether and to what extent a teacher should inflict on his students his own personality, ideas, theories and deductions or whether he should put before his students the many and varied ideas on any important subject and allow them to choose for themselves the one which best fits their understanding. Here, perhaps, a compromise is the best solution and a mild degree of dogmatism may be less confusing to a student than loose browsing over a wide and often controversial field. At the risk of myself being somewhat dogmatic, I would say that the teacher should place the minimum reliance on notes and indeed if he can dispense with them altogether so much the better. It does not seem reasonable to expect students to absorb and retain in their minds facts and reasonings which the teacher himself is unable to dispense except from notes. True, it may be that in the "impromptu" lecture a teacher may well overlook certain points connected with his subject, but it is the imparting to his students of trains of thought, methods of learning and interest in the subject rather than the forcible and laborious injection into them of stereotyped material, however model in arrangement, that the teacher best performs his basic function.

You may like to discuss the extent to which teaching and research by the same person is profitable. I know there are some who hold the view that it is extremely difficult, if not impossible, for a teacher to be a good research worker and *vice versa*. Where staffs are limited in numbers and where each individual member has to cover a wide field of teaching it is probable that his activities in research may harm the quality of his teaching. On the other hand where staffs are sufficiently large to enable that system to be adopted whereby individual teachers need deal with only a selected and limited number on the course, research and teaching could with advantage run hand in hand.

The Examiner

If suitable students and suitable teachers are difficult to come by then we can rightly say that suitable examiners are well nigh impossible to find. The person who can on every occasion and under every circumstance rightly assess the true merits of a candidate after examining him in written, practical or oral or a combination of the three is a "pearl beyond price" and as such is a rare specimen. There are, however, certain criteria by the observance of which an examiner could approach at least within reasonable distance of excellence. One feels that the first requirement for an examiner is that he shall examine in the subject in which he is competent to

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examine and not in any other. His competence may arise from long years of experience or, on the other hand, being young he may have to rely on concentrated experience over a few years only. It may well be that in the young examiner resilience of outlook may more than compensate for lack of experience while the more mature examiner may discount his wide experience by his intolerance of a younger generation, including the candidates.

The functions of an examiner as one sees it are to approve or pass, as we more commonly describe it, the maximum number of candidates consistent with the maintenance of a reasonable standard of knowledge and common sense in those he approves. It will be a wonderful day when we arrive at the position where an examiner finds no compunction in approving every candidate presented before him or conversely of disapproving or failing every candidate.

A question which may form the subject of an interesting discussion is whether an examiner is better for having had experience in teaching. The internal examiner does of course have this experience and some, but not all, external examiners will be in the same category. Here again the "middle of the road" system is probably the best, *i.e.*, that some at least of the external examiners should be possessed of teaching experience and some be without it. There is no doubt that those who spend a large proportion of their time teaching students come to understand the student mentality fairly well and having introduced, one hopes, information into his mind knows fairly well how to extract it again, or rather, how to determine how much knowledge has remained with the student, how deeply it has become fixed in his mind and to what extent he has allowed it to mature and propagate. On the other hand, there is an element of danger in selecting as examiners only those with teaching experience, as, however much they may fight against it, teachers inevitably develop an academic outlook. Even so, some of them do succeed in some measure in maintaining a broad practical outlook on their subject. The external examiner whose outlook has not been influenced by academic considerations is able to maintain the balance between academic and non-academic influences and by his presence as an examiner does indirectly influence not only the examination but the teaching which precedes it.

The time available for the presentation of this communication precludes one from doing more than raise a few of the issues involved in connection with what one has called "The Three Points In a Teaching Triangle." No one person is capable of setting out a complete standard by which these three classes of individuals can be appraised and all one can usefully do is to raise a number of "talking points" around which discussion centres at a gathering such as this. One hopes therefore that what one has said may not only stimulate the ensuing discussion but also leave ideas sufficiently interesting to stimulate continued thought in the minds of those in whose hands may now, or at some later date, rest the future of succeeding generations of veterinary surgeons.

Some Causes of Death in Wild Birds in Britain

BY

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SUMMARY.—A survey has been made to determine the causes of death of free-living wild birds in Britain. A total of 800 *birds has been examined representing* 104 *species. Trauma was responsible for* 29 *per cent. of the losses, infectious diseases for* 18 *per cent., poisons accounted for* 10 *per cent., and adverse climatic factors (starvation, chilling, and stress)* 11 *per cent. In* 18 *per cent. of the birds the cause of death was not determined, parasitic disease gave a* 4 *per cent. death-rate and miscellaneous causes accounted for* 10 *per cent. of all deaths.*

Introduction

THE density of the bird population of the British Isles varies greatly from area to area. In some localities there is a high concentration of birds; thus in the small island of St. Kilda, according to Fisher and Lockley (1951), there are about 17,000 nests of gannets, about 4,000 fulmars, and over 1,000,000 puffin eggs are laid each year. These 3 species represent only the most numerous of the many birds nesting on St. Kilda. Against this, however, it has been estimated that agricultural land in general supports between 1 and 3 birds per acre, but wherever colonial nesting species occur the density per acre increases rapidly.

Most ecologists agree that the total numbers of animals and birds remain fairly static over periods of many years, despite population fluctuations. It has long been known that population cycles occur and that these cycles may be regular or irregular in their distribution, but the causes of cyclic variations are still imperfectly understood. Changes in the population types may occur and some birds have become, or are on the verge of becoming, extinct, whereas other species are able to adapt themselves to new conditions and continue to flourish. In some avian species very exact population numbers are known, and when variations occur they are easily detected. Since in general the numbers of any particular species of bird remain constant, the numbers of adults which die each year must equal the number of new individuals each year.

The adult mortality is best estimated by a combination of several methods. One technique is to catch and mark all the birds of a particular species within a given area over a period of years. Nation-wide ringing is another method and the age at death of the ringed birds is then estimated. A third method is based upon the determination of new adults breeding for the first time. By these methods the adult mortality has been calculated and shown to represent a death-rate of between 40 and 60 per cent. in various song birds, ducks, and gallinaceous birds, between 30 and 40 per cent. in wading birds, and gulls, and about 20 per cent. in swifts (Lack, 1954).

Life expectancy tables have been devised for various species of birds (Deevey, 1947), and it is known that the average expectation of life of song birds is between 1 and 2 years and for waders and gulls it is between 2 and 3 years. Larger birds with long periods of immaturity may live for much longer periods.

As might be expected, there is a very high loss in eggs and nestlings, and Lack (1954) estimated that between 80 and 93 per cent. of all eggs fail to produce adults. Detailed studies of this mortality have been made in some species, for example, about 49 per cent. of herring gull (*Larus argentatus*) chicks have died by the fourth day and 65 per cent. by the sixth day, and some 87 per cent. of lesser black-backed (*Larus fuscus*) chicks disappear after hatching. Scott *et al.* (1954) estimated that 60 per cent. of pink feet (*Anser brachyrhynchus*) goslings die before they enter the measurable British population. Jennings and Soulsby (1956a) have demonstrated similar heavy nestling losses in black-headed gulls (*Ladus ridibundus*) and in several species of tern.

Clearly, then, Britain's very large young and adult bird population suffers annually a high mortality, but the causes of this are not well understood. The purpose of the survey which forms the basis of this report was to determine some of these causes.

Materials and Methods

Members of the British Trust for Ornithology were asked to send in for examination any dead or dying birds which they found together with any relevant information. Thus they were asked to state the surroundings in which the bird was found, whether the bird was representative of several, if there had been recent crop spraying in the area or any exceptionally severe weather and so forth. The dead birds were then submitted to a routine poultry *post-mortem* examination and, where necessary, the standard bacteriological, histological, and parasitological techniques were used.

Results

The results of the survey are tabulated below. Detailed findings in individual birds have already been published or are in press elsewhere (Jennings, 1954, 1955; Jennings & Soulsby, 1956b, 1957; Jennings, 1958).

THE CHIEF CAUSES OF DEATH

	per cent.
Injury	29
Poisons	10
Climatic factors	11
Parasites	4
Infectious disease	18
Miscellaneous causes	10
Cause unknown	18

Injury

Trauma was one of the chief causes of death in this survey, various types were encountered, death being due to haemorrhage or shock or a combination of these. Motor accidents caused a high mortality amongst song birds, particularly the thrushes, and injuries caused by telegraph wires were frequent. Migratory species were frequently found dead at the base of lighthouses.

Climatic Factors

Marked changes in the air temperature, especially associated with heavy and prolonged rain, was a common cause of death in the young of the nidifugous species. Many young birds died from the syndrome of "chilling." The chief lesions were acute pulmonary congestion and oedema, in some cases there was a well-developed pneumonia. The gall-bladder was enlarged and full of a viscous bile. Severe weather sometimes resulted in death from inanition. Deaths from exhaustion were also seen following exposure to severe weather during migration.

Poisons

Large numbers of pheasants (*Phasianus colchicus*) and wood pigeon (*Columba palumbus*) died from dieldrin poisoning. Usually only single birds were sent in for examination but the reports indicated that very large numbers of birds were affected. Long periods of cold, dry weather favoured this type of poisoning, since the seeds did not germinate and other food was not easily available. Phosphorus used in rat baits caused the death of small passerines and several owls died after eating poisoned rodents. A few cases of oiling in sea birds representative of several thousand were sent in. The birds were unable to fly or swim and death was due to inanition or to the irritant action of the oil on the alimentary tract.

Infectious Diseases

In the survey 18 per cent. of the birds died from infectious disease. The most frequently encountered conditions were tuberculosis, pseudotuberculosis, salmonellosis, pasteurellosis, coligranuloma, and *E. coli* septicaemia, aspergillosis, avian pox, and a viral exanthema of gulls and oyster catchers (*Haematopus ostralegus*). In addition a condition indistinguishable from avian leucosis was seen. The lesions in these various infections resembled those seen in domestic poultry and require no further amplification.

Miscellaneous Causes

Tumours were not uncommon in the birds examined, and in some cases were thought to be the direct cause of death. Thus in a blue tit (*Parus caerulus*) the intestinal tract contained multiple round-cell sarcomata, a wood pigeon (*Columba palumbus*) had a primary spindle-cell sarcoma on the sternum with widespread visceral metastases, and a blackbird (*Turdus merula*) extensive involvement of the kidneys with an adeno-carcinoma. Cases of pneumonia, pericarditis, nephritis, and hepatitis were included under this heading of miscellaneous causes.

Discussion

The birds examined in this survey cannot be regarded as a representative sample of the bird population of Britain, and the numbers examined bear little relationship to the annual mortality. It must be borne in mind that dead birds are not often found since the bodies are rapidly removed by scavengers and sick birds fall as easy victims to predators. The dead birds are sent in mainly by amateur ornithologists whose opportunities for bird watching are largely limited to week-ends and holidays.

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Although in the survey 10 per cent. of the birds were thought to have died as a result of some form of poisoning it is unlikely that in the bird population as a whole, 10 per cent. die each year from this cause. It is, however, clear that poisonous substances kill large numbers of birds. They may cause the death of single birds or large numbers may die during widespread contamination. Thus some of the selective weedkillers and the organo-phosphorus insecticides may cause heavy losses in birds. D.N.C. poisoning results in a deep yellow stained carcase, venous congestion of the viscera, and widespread petechiation. Systemic insecticides which are absorbed by the plant may cause many deaths in wild birds and mammals. Clapham (1954) listed 154 dead birds picked up after 46½ acres had been sprayed with an organic phosphorus compound.

The dangers to bird life of dieldrin poisoning have already been commented on by Carnaghan and Blaxland (1957) who drew attention to an unusually high mortality in wild birds in the Southern, Midlands and Eastern Counties of England.

In this paper no mention has been made of predation as a cause of death yet this must be an important controlling factor in small passerines and to a lesser extent in some game birds. It is difficult to study the effects of predation upon bird numbers and no information appears to be available for Britain. In Holland, however, Tinbergen (1946) suggested that sparrowhawks (*Accipiter nisus*) might have an important effect on the numbers of house sparrows (*Passer domesticus*). In May, 1946, 79 per cent. of the mortality in house sparrows in one area was due to sparrowhawks, as was 44 per cent. of the mortality in great tits (*Parus major*) and 30 per cent. of the mortality in chaffinches (*Fringilla coelebs*).

A striking example of the effects of climate upon bird numbers is seen in the case of the heron population in Britain. After an abnormally cold spell there is a marked drop in numbers of these birds, and between 2 and 4 years are required to build up the population to its former level. Severe weather usually means a restriction of the food and water intake with serious effects upon the birds. Latham (1947) demonstrated that generally the female bird was better able to withstand climatic extremes and starvation than was the male, and that this resistance was most marked in birds which are polygamous. Low temperatures cause the birds to draw on their energy reserves and in severe weather these reserves cannot be made good. In an examination of dead birds found during a cold spell, Ash (1957) concluded that diseased, injured, or heavily parasitised birds were the first to die during severe weather.

Of the infectious diseases, the viral condition we have called vesicular dermatitis (Jennings & Soulsby, 1958) is of interest. This disease is characterised by the formation of vesicles on the feet; these vesicles rupture and leave ulcerated areas. There may be a high mortality in the immature birds. The condition resembles in some respects that described by Dane (1948) in Manx shearwaters (*Procellaria puffinus*). We were able to infect very young domestic ducklings with the causal agent, but we were not able to infect pigeons, whereas Miles and Stoker (1948) were able to do so with the agent of "puffinosis."

Acknowledgments.—I wish to record the technical help of Miss E. A. Robb during the course of this work, and I am grateful to the Administrators of the H. E. Durham Fund for financial assistance towards the cost of these investigations.

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The Use of Rush Pins in the Management of Fractures in the Dog and Cat

BY

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SUMMARY.—The use of Rush pins, specially shaped intramedullary pins, is described, particularly in relation to fractures close to joints.

The mechanics of these pins is discussed.

A comparison is made with the alternative procedures available for each fracture discussed.

The veterinary literature on the subject is discussed and reference made to the original works described in human literature.

DURING the post-war period much advance has been made in the application of methods of internal fixation of fractures in the dog and cat. Certain procedures such as intramedullary pinning and plates and screws have proved to be of great value and have become widely accepted techniques in the treatment of fractures of the shafts of long bone. There are, however, a number of fractures, especially those close to joints, which for various anatomical reasons cannot be readily handled by those methods. It is proposed, in this communication, to describe Rush pins, and more particularly their application to this group of fractures.

The Rush pin is a specially shaped, round-section intramedullary pin which has a "sledge runner" tip, so shaped that it will glide along the inner face of the cortex of the bone, and it has a hooked end which

grips the cortex at the point of insertion and lies close in to the bone surface so that it causes little or no soft tissue damage or irritation (Fig. 1).

FIG. 1.—The Rush pin is specially shaped with a "sledge-runner" tip and a hooked end smoothed off so as to cause minimal soft tissue damage.

These pins are used in sizes which are much smaller than the diameter of the medullary canal and are inserted obliquely so that they have a spring-like action which counteracts the muscular pull that is responsible for the displacement of the fracture segments. This factor is most easily demonstrated when this method is applied to fractures of the shafts of long bones (Rush & Rush, 1949, 1950), but it is also of importance in fractures close to joints.

In common with non-impacting round-section intramedullary pins, Rush pins permit the action of the muscle masses to cause "contact-compression" of the fractured ends of bone (long bones are under constant longitudinal compressing force from the action of the muscle masses which surround them) and this contact-compression of the fracture promotes the healing of the bone (Eggers *et al.* 1949).

The fractures for which Rush pins have proved to be of value are:—

1. Supracondylar fracture of the femur.
2. Supracondylar fracture of the humerus.
3. Fracture of the lateral malleolus of the fibula with fracture dislocation of the hock joint.
4. Chip fractures close to joints (*e.g.* radius and ulna).

Many of these fractures occur in young animals in which the epiphyses are not yet fused, but they may also occur in older animals.

(1) Supracondylar Femoral Fracture

This fracture occurs with considerable frequency in both adult and immature animals, in the latter it is distal epiphysis of the femur which is separated.

The site of this fracture renders the use of intramedullary pins unsatisfactory because:—

(a) The distal fragment of bone is too small to afford sufficient length to assist in the longitudinal alignment of the segments.

(b) The distal fragment consists largely of cancellous bone covered by a thin layer of cartical bone which does not have sufficient strength to withstand the constant pull of the gastrocnemius muscle which tends to cause backward displacement of the distal extremity and so the point of the pin may break through the trochlea and enter the femoro-patellar joint.

(c) The femoral shaft, in the dog, frequently has a backward bend at its lower third and this may preclude the use of a pin any distance below this point since it tends to penetrate the anterior cortex.

The procedure adopted is as follow:—

(i) Expose the fracture by exposing the lower part of the femoral shaft, shifting between the vastus lateralis and the biceps (Blount, 1929), and continuing the incision down so as to open the femoro-patellar joint completely on the lateral side.

(ii) Reduce the fracture—this is most easily carried out by first flexing the stifle joint fully and then attempting replacement. In the dog reduction may be facilitated by cutting part of the origin of the gastrocnemius from its attachment to the femoral shaft.

(iii) Drill two oblique holes in the cortex of the distal fragment at the points of insertion of the pin. These points lie medial and lateral to the distal end of the two trochlea ridges, respectively (Fig. 2).

(iv) Insert both pins together, after making certain that fracture reduction is satisfactory (slight over-correction of the fracture is often useful since the muscular action will be found to pull the segments into proper alignment).

(v) Close the operation site in layers.

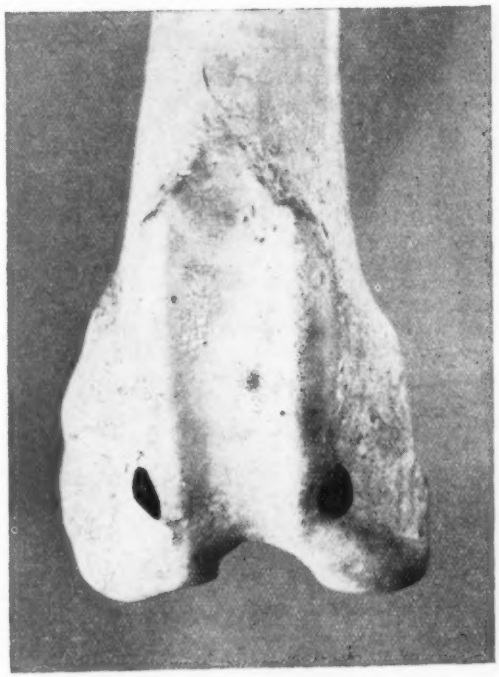

FIG. 2.—Distal extremity of femur marked to show the points of penetration of the Rush pins at the junction of trochlea and condyles.

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Comparison with other methods:—

The use of a penetrating medullary pin, inserted through the trochlea, has been described. This has the same disadvantages as the non-penetrating pin, with only a slightly better grip, it also causes damage to the femoro-patellar joint surface.

Kirschner-Ehmer units can be successfully applied to this fracture, but the operative technique required is just as complex as with the other procedures and the possibility of bone infection is present.

The use of an oblique screw passed down from the anterior cortex of the femoral shaft can only be inserted into the cancellous bone of the intercondyloid space. The approach to the point of screw insertion is complicated by the overlying muscle.

The use of two Rush pins as described affords maximum grip on the distal segment without interference with the joint surface since they are inserted where the bone cortex is thickest, at the edge of the ridge of the trochlea. The direction at which the Rush pins are inserted gives good stability since each pin presses on 3 joints: at the point of insertion; on the posterior cortex of the femur at the fracture site; and at the point where the tip of the pin impinges against the inner face of the antero-lateral cortex.

(2) Supracondylar Fractures of the Humerus

Occasionally the distal epiphysis of the humerus separates in young dogs, more commonly oblique fractures of the lowest point of the humerus shaft occur, either with or without a secondary chip or butterfly segment in older dogs. It is possible to fix either of these fractures by a single intramedullary pin passed down the length of the bone into the medial condyle, but much better fixation is effected by the use of two Rush pins passed up from the medial and lateral condyles into the humeral shaft. The Rush pins which are used must be of unequal size since the continuation of the medullary canal passes down to the medial side and on this side a moderate size of pin may be accommodated, whereas on the lateral side the medullary canal passing down into the condyle is either very small or is blocked by cancellous bone.

The operative technique employed in these cases is to drill the holes in the distal cortices of the humerus by a "reverse drilling" technique. The point at which the pins penetrate the cortices varies a little on each side but lies just posterior to the corresponding epicondyle, medially on a flat face and laterally on a sloping face (Fig. 8).

After drilling, the Rush pins are passed up through the holes, the fracture is aligned, and the two pins are advanced together.

This form of fixation provides a very good immobilisation, even in cases where a "butterfly-segment" has been separated and is not actively fixed in position but is simply allowed to lie *in situ*. (Figs. 9, 10 and 11).

(3) Fracture Dislocation of the Hock Joint

This condition occurs in the dog with relative infrequency but there are a series of injuries which can occur. The most important of these is fracture of the lateral malleolus which, because it carries with

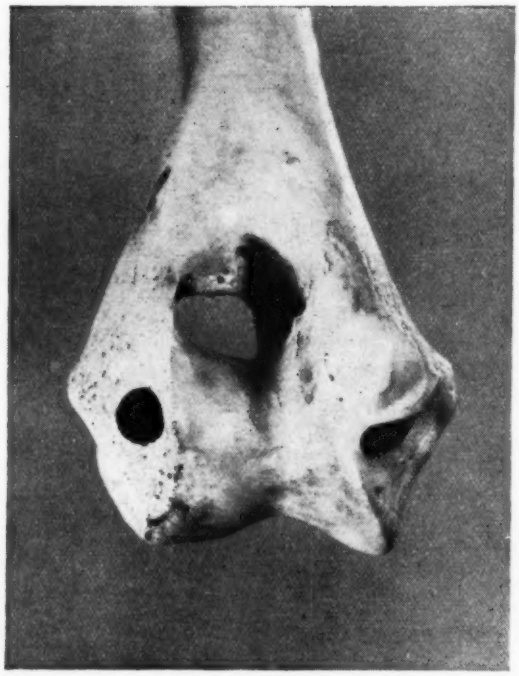

FIG. 8.—Posterior view of distal extremity of dog humerus marked to show point of penetration of Rush pins.

FIG. 3.—Radiograph of specimen of femur to show Rush pins *in situ*.

FIG. 4.—Radiograph of distal epiphyseal fracture of the femur of the dog, showing the typical backward displacement of the distal segment.

FIG. 5.—Radiograph of limb shown in Fig. 4 to show fracture fixation by two Rush pins.

FIG. 6.—Radiograph of distal epiphyseal fracture of the femur of the cat.

FIG. 7.—Radiograph of limb shown in Fig. 6 to show fixation effected by Rush pins.

FIG. 9.— Radiograph of specimen of humerus to show Rush pins *in situ*—note that the pins are of different thicknesses.

FIG. 10.—Radiograph of fracture of the distal end of the shaft of the humerus, with an associated butterfly segment.

FIG. 11.—Radiograph of limb shown in Fig. 10 showing fixation with two Rush pins. Fixation is quite rigid despite the unfixed butterfly segment.

FIG. 12.—Radiograph of a specimen of tibia and fibula to show a fine Rush pin passed upward from the lateral malleolus and through into the shaft of the tibia.

FIG. 13.—Radiograph of fracture dislocation of the hock of the dog. The distal extremity of the fibula can be seen, isolated, on the anteroposterior view.

FIG. 14.—Radiograph of the limb shown in Fig. 13 showing effective realignment achieved by the use of a fine Rush pin. The small medial malleolus is visible in the anteroposterior view and has been left without fixation.

D. D. LAWSON.—THE USE OF RUSH PINS IN THE MANAGEMENT OF FRACTURES IN THE DOG AND CAT.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIG. 9.

FIG. 10.

FIG. 11.

FIG. 12.

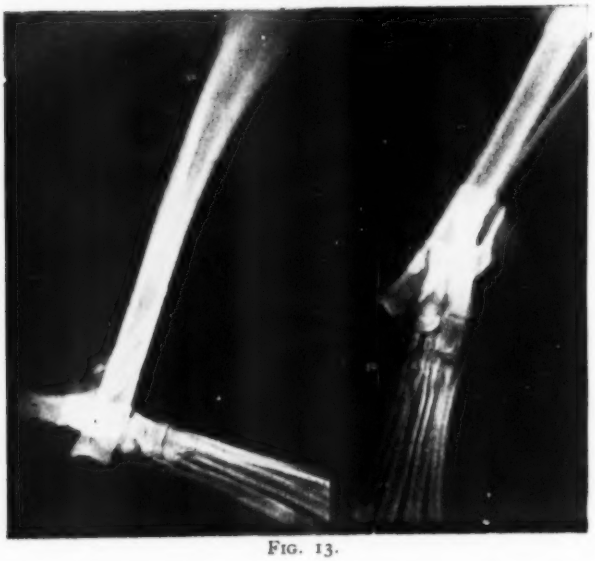

FIG. 13.

FIG. 14.

it the lateral colateral ligament, causes marked joint instability which cannot be handled by conservative means.

The standard operation employed for this in man is the use of one transverse screw passing through into the tibia. This method has also been described for the dog (Leighton, 1957) but it can only be employed in very large animals because in smaller dogs the distal end of the fibula is too small to hold a screw.

(4) Chip Fracture

Chip fractures of the distal end of the radius may be held in position by Rush pins. In this site the spring action of the pin acts on the chip to hold it firmly in position.

Discussion

The application of Rush pins has proved of value in the treatment of certain fractures, especially those occurring close to joints in sites in which only small segments of bone must be afforded good support (see Table).

TABLE

SUMMARY OF THE RESULTS OBTAINED BY FRACTURE FIXATION BY RUSH PINS IN DOG AND CAT

	Operations	Function fully restored	Function partly restored	Failure	Result unknown
Distal epiphyseal or supracondylar fracture of the femur	27 { 13 dogs, 14 cats	21 { 10 dogs, 11 cats	2 { 1 dog, 1 cat	1 { —, 1 cat	3 { 2 dogs, 1 cat (all current cases)
Supracondylar humeral fracture with butterfly segment. (In one case the fracture was in the lower mid-shaft)	4 dogs	4	–	–	–
Fracture dislocation of the hock joint	3 „	3	–	–	–
Chips from radius and ulna	1 dog	–	1	–	–
Very high femoral shaft	1 cat	–	1	–	–
Comminuted mid-shaft femur	1 „	–	–	1	–
Low transverse radius and ulna. (Single pin in radius)	1 dog	–	–	1	–
Double supracondylar fracture of humerus—with additional use of Webb bolt	1 „	–	–	1	–

Not all of the groups listed in the above table have been discussed in the text and these additional cases have been included merely to indicate the range of fractures in which the use of Rush pins has been attempted.

A fine Rush pin can, however, give good joint reconstruction, if it is passed up through the previously reverse-drilled lateral malleolus and then fed through a very oblique hole (slit) in the lateral cortex of the tibia (Fig. 12). This causes the distal end of the fibula to fuse into the side of the tibia and so results in enhanced strength of the part.

Additional support to the part must be given by the use of plaster cast because of the very small size of the pin that is used (Figs. 13 and 14).

A major complication may arise in this condition, namely rupture of the medial collateral ligament, and if this occurs the ligament must be sutured, through a second incision, at the same operation as the fixation of the lateral malleolus, otherwise considerable joint instability will remain.

Fracture of the medial malleolus may occur along with lateral malleolar fracture, but this is not a serious complication and may be ignored. In fact, if medial malleolar fracture occurs on its own only a slight temporary lameness results, despite the fact that the fracture often does not heal.

Very rarely in young animals the distal epiphysis of the tibia may separate, and this simulates hock dislocation. This fracture presents a virtually flat fracture line because of the shape of the epiphyseal plate.

Realignment and fixation of this fracture may be achieved by the use of two Rush pins, additional support being allowed by the plaster cast.

Their application has been described only twice in veterinary literature. Carney (1952), in the U.S.A., described their application to the femoral and tibial shaft. Their use in these sites in the dog, however, do not offer any great advantages over the straight intramedullary pins. The second author, Suppiger (1957), of Switzerland, has published a fuller description of their use and has included work on the shafts of long bones.

The comparison of this method and the others which are available in these sites is given under each head and the author considers that this procedure offers many advantages in flexibility and ease of application.

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(The Symposium is continued overleaf)

Some Aspects of Intervertebral Disc Protrusion in the Dog

BY

L. C. VAUGHAN

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DURING recent years there has been such an increase in the knowledge concerning the various aspects of intervertebral disc protrusion in the dog that to attempt to cover the whole subject, even sketchily, in the time allocated to the speaker would be quite impossible. Furthermore, such an attempt would do less than justice to this intriguing, often perplexing, but always interesting condition with which the British veterinarian has only in the last 10 years become fully acquainted. For this reason, only certain of the more controversial aspects of the disease will be considered.

In the title of this paper the disease has been given its full and proper name. The term "slipped disc" has been purposely avoided because it is my belief that this designation, which has been borrowed from medical jargon and perpetuated by the lay press, is to the disadvantage of the practising veterinary surgeon. To the lay person the term indicates the mere displacement of a disc and that to "slip it back again" ought to be a relatively simple matter. Any attempt to convince the dog owner that the "slipped disc" has not in fact just "slipped" requires much explanation and no little patience. What is more, one is not helped by the fact that every other dog owner seems to have had some personal experience of the condition. The graphic descriptions one hears of the dramatic replacement (not forgetting the proverbial "click") of "slipped discs" in their own persons makes one think this should not happen to a dog.

The position of an intervertebral disc in the spine and in particular its relationship with the neural canal is well illustrated in sagittal sections of the spinal column cut by adapting the Gough-Wentworth (1947) technique, which is mostly used for sectioning soft tissue and especially lung tissue (Fig. 1). The sections, which are $\frac{1}{2}$ mm. thick and are mounted on paper as transparencies, have been particularly useful for demonstrating the site and size of rupture in a disc, as will be shown later. The central portion of a disc is a semi-liquid substance, the nucleus pulposus, and it is surrounded by a tough, lamellated material, the annulus fibrosus. The nucleus is eccentric in position so that the annulus is half as thick dorsally as ventrally. It is not surprising then, that the nucleus most commonly becomes displaced in a dorsal direction, into the spinal canal. In the dog the spinal cord fits the bony canal so snugly that it must immediately be contacted and endangered by displaced disc substance.

An outstanding feature of the disease is the frequency with which the middle-aged dog of certain breeds, namely Dachshund, Spaniel, Pekingese, are affected. Hansen (1952) has shown that in the "prone" breeds the discs undergo a premature degeneration far in advance of the senile changes that occur in the discs of the rarely affected breeds of dog. In fact by middle-age (4 to 6 years) the degenerative process (which is briefly a collagenous change of the normally mucoid nucleus) is advanced and it has to be remembered that at this age the dog is still capable of vigorous activity; the sort of vigorous activity that the degenerate disc is unable to withstand. So it will be seen that the breed and age incidence are readily explained. As to what fundamentally controls these premature disc changes is as yet a matter of conjecture. From the writer's own observations it has been found that hormonal and familial influences are of no little significance. Frequently in the bitch it has been noticed that a protrusion coincides either with oestrous or when the bitch is markedly pseudopregnant. It has been established that in certain connective tissue sites reversible mucoid-collagenous changes may be mediated by the sex hormones (Maximow & Bloom, 1944). Since the important change in the disc with age is a premature collagenous change in the mucoid tissue of the nucleus pulposus, it may well be that there is an endocrine background to this phenomenon.

The incidence of this disease in certain families of dogs is not easy to follow as in this species the progeny are sold widespread and by the time they reach middle-age would be extremely difficult to contact. In several instances, however, the writer has found closely related members of particular lines of Dachshund affected. In one case there were 4 closely related dogs. This may be a profitable line of research.

The affect of trauma in the causation of disc protrusions has already been touched upon. It seems obvious that the degenerate disc cannot support the same amount of stress as the healthy structure. The final collapse may occur as a result of an untoward accident or be just the result of the repeated stresses borne by the disc in the dog's everyday existence. This seems to be borne out by the fact that the discs most commonly affected are those in the spinal regions most subjected to stress and strain, namely at and in close proximity to the thoraco-lumbar junction, and in the neck.

The signs and symptoms which a dog may exhibit as a consequence of disc protrusion include pain (cervical or lumbar), inco-ordination, paraplegia or even quadriplegia. Obviously the regional situation of the lesion controls one aspect of symptom variance. An interesting feature is that the severity of the symptoms is not always proportional to the size of the protrusion. For example, it is not unusual to find at the autopsy on a dog with paraplegia that the protrusion was small and incapable of severe cord compression. On the other hand mild symptoms may be associated with a very large protrusion that caused marked indentation of the cord. These findings are rather contrary to the older concept that the severity of symptoms exhibited was always directly influenced by the degree of compression of the cord, whether the compressing agent

(*The Symposium is concluded at the foot of page* 765)

Cystic Calculi in the Cat

BY

R. Churchill Frost

Royal Veterinary College, London

SUMMARY. Radiographic and surgical evidence of cystic calculi in the domestic cat is reviewed. A successful cystotomy for the removal of two cystic calculi is described.

URETHRAL obstruction of the male domestic cat is common, but there are few references to cystic calculi irrespective of sex. Milks (1935) reports one case of a cystic calculus but the sex of the cat is not given. Stephenson (1939) describes one case of urethral obstruction in a castrated male cat which on X-ray showed a cloud-like appearance in the urinary bladder. When the bladder was emptied of urine the stones could be felt like marbles or BB shot within a bag. The same author states that he has never encountered any large stones in the bladder of the male cat. Martin (1958) reports that a mature male Siamese cat was successfully operated on for the removal of a cystic calculus. This cat had a 3-week history of haematuria, the degree of which varied from day to day. Medical treatment was of no avail. The other symptom noticed was that the penis was frequently rubbed on the floor.

Reference to the records of the Beaumont Animals' Hospital shows that 5 cases of cystic calculi were observed prior to 1957. None of these cats was seen by the author but the case histories are as follows:—

Case 1.

Castrated male cat aged 5 years. Three days after urethral obstruction was relieved the cat had haematuria and cystitis. A radiograph revealed multiple cystic calculi averaging 1 to 2 mm. in diameter. There is no subsequent history.

Case 2.

Spayed female cat aged 5 years. There was a history of haematuria of indefinite duration. X-ray showed one vesical calculus about 2 mm. in diameter. Seven months later the symptoms persisted and a radiograph showed an opacity 7 x 2 mm. Seven months after this, the cat was reported to have had a period of normality followed by a recurrence of symptoms. Radiography revealed one calculus about 8 x 6 mm. This cat was not seen again.

Case 3.

Spayed female cat aged 4 years. There was a history of frequency and X-ray revealed multiple small cystic calculi, the largest appearing to be 2 x 1 mm. This cat was not examined again.

Case 4.

Castrated male cat aged 6 years. Partial urethral obstruction was relieved and sandy, sabulous material

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Symposium—*Concluded.*

was tumour, fracture fragment or disc protrusion. Olsson (1951a) has suggested that the force at which the disc protrudes is the significant factor, so that the most rapidly occurring lesion causes the severest symptoms. Indeed, Olsson, and other workers, visualise in the acute cases the explosive emptying of nucleus substance into the neural canal. The present writer finds this difficult to believe for the following reasons. Firstly, as a result of premature collagenisation the nucleus becomes solid in consistency; secondly, the track through the annulus along which the nucleus escapes is mostly a meandering one; thirdly, the actual rupture site as measured on Gough-Wentworth prepared sections, have been found to be minute; from ½ to 1½ mm. in 6 cases (Figs. 2, 3). It is difficult to imagine solid nucleus substance escaping along a winding track and finally through a minute opening with any speed or force. Alternatively, the writer would suggest that the degree of inflammation, the amount of haemorrhage produced and the extent to which the blood supply of the spinal cord is damaged, vary considerably and it may well be that these factors play the most significant part in symptom variance.

In this paper it has been possible only to introduce a few facets of this most fascinating problem. It should be emphasised that the lesion of this disease is no mere "slipping" of the disc but a complete extrusion of disc substance into the neural canal. Furthermore it is the present author's opinion that the bulk of the protruded material is not destined to return to its site of origin by manipulation or any other means.

Acknowledgments.—The author is indebted to Professor C. Formston, F.R.C.V.S., for his encouragement and advice; to Dr. E. E. Payne, The Royal Infirmary, Cardiff, for introducing the author to the Gough-Wentworth technique; and to E. F. Lewis, M.R.C.V.S., for preparing the photographs. Grateful thanks are due to the publishers of the *British Veterinary Journal* for permission to reproduce the photographs, Figs. 2 and 3 (Vaughan, L. C. (1958) *Brit. Vet. J.* **114,** 105).

[The figures for this Paper appear on an art sheet facing page 766]

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removed from the penis. The cat improved with antibiotics and urinary antiseptics. Eight months later the cat had frequency with dysuria. Haematuria and sabulous material were present. A radiograph showed a cloud-like area within the urinary bladder. This opacity was 15 mm. x an average of 6 mm. The cat improved with medical treatment and has not been seen since.

Case 5.

This case was under observation for 2 years between the ages of 2 and 4. It was a female Persian cat which showed occasional dysuria and haematuria. Radiography at 2 years of age revealed multiple small cystic calculi, the largest of which appeared to to be 2 x 1 mm. X-rays on 3 occasions between 2 and 3 months later did not show any abnormality. Nevertheless, 5 months after the original examination, multiple calculi were visible on X-ray, the largest being 2 x 2 mm. Six weeks after this there were several small calculi visible, in general larger than before, the largest being 4 x 3 mm. At 4 years of age, some 18 months later, X-ray demonstrated one diffuse cystic opacity 14 x 10 mm. Shortly after this, the cat died in advance pregnancy and did not become available for further examination.

It will be seen that the symptoms common to these cases are haematuria and frequency. These symptoms are not uncommon in the cat and when of a chronic nature and unresponsive to medication, it may well be that cystic calculi are present. The following is a case report which illustrates this contention.

Subject. Spayed female cat aged 7 years.

History. Urinary disorder of 2 years' duration. During the first 6 months there was tenesmus and frequency. This was followed by haematuria which improved with medical treatment. For the few months preceding examination, frequency and haematuria were constant.

Symptoms. A thickened, contracted urinary bladder was felt on abdominal palpation. The urine was bloodstained and urine analysis revealed blood ++++ and protein ++ as the only abnormalities. X-ray examination showed two cystic calculi (Fig. 1).

Operation and observations. At a later date, under general anaesthesia, intravenous urography as described by Harrod and Frost (1955) was undertaken using 2½ c.c. radio-opaque material.* This did not reveal any abnormality of kidneys or ureters (Fig. 2). The calculi were removed by a prepubic cystotomy. The bladder wall was thickened and the mucous membrane was haemorrhagic. Recovery from the operation was uneventful and 50 mg. of chloramphenicol † was administered orally 8-hourly for 4 days. On the second day the cat was returned to the owner and the haematuria became progressively less and was absent on the 4th day.

On the 5th day the skin sutures were removed and the urine showed the presence of minute crystals (Fig. 3). For the next 15 days, 5 grains of hexamine were administered 12-hourly, by which time the cat had developed normal control of urination with no evident urine abnormality. The cystic stones (Fig. 4) were circular, flattened and crystalline in appearance. Analysis showed them to consist largely of calcium and magnesium phosphate. The largest was 11 mm. diameter by 3 mm. thick and the smaller, ovoid 8 x 6 mm. and 2 mm. thick.

Acknowledgment.—Mr. J. S. Wilkinson, B.SC., M.R.C.V.S., for the analyses.

* Hypaque (Bayer).

† Chloromycetin (Parke, Davis).

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CANINE INSURANCE

Our readers may be interested to learn a few details of two canine insurance schemes which have just been introduced. The first, which is larger in scope, enables owners of dogs to take out a policy with Lloyd's which provides the following benefits: compensation for the death of a dog, which includes humane destruction on veterinary advice; repayment to the owner of veterinary fees from 3 to 20 guineas incurred for treatment; and third-party liability up to £10,000.

The originators of the scheme, Messrs. Chandler Hargreaves, Whittall & Co., a firm of London insurance brokers, hope that such insurance will encourage more owners of dogs to seek the services of veterinary surgeons and practitioners on the Supplementary Register; and it is their intention to make a donation from their commissions to the Animal Health Trust Canine Centre.

The second insurance scheme covers street accidents only, and is being run by Messrs. Spillers. The receipt, by the company, of coupons from their cartons of dog food will entitle users of the food to an insurance cover of £10 against the cost of treatment if their dogs are involved in street accidents. This, again, should have the effect of encouraging people to seek immediate professional advice, with consequent benefit to injured animals.

THE COLONIAL VETERINARY SERVICE

Mr. D. G. White, B.SC. (AGRIC.), M.R.C.V.S., Assistant Director of Veterinary Services, Tanganyika, has become Deputy Director of Veterinary Services, Tanganyika.

R. CHURCHILL FROST.—CYSTIC CALCULI IN THE CAT.

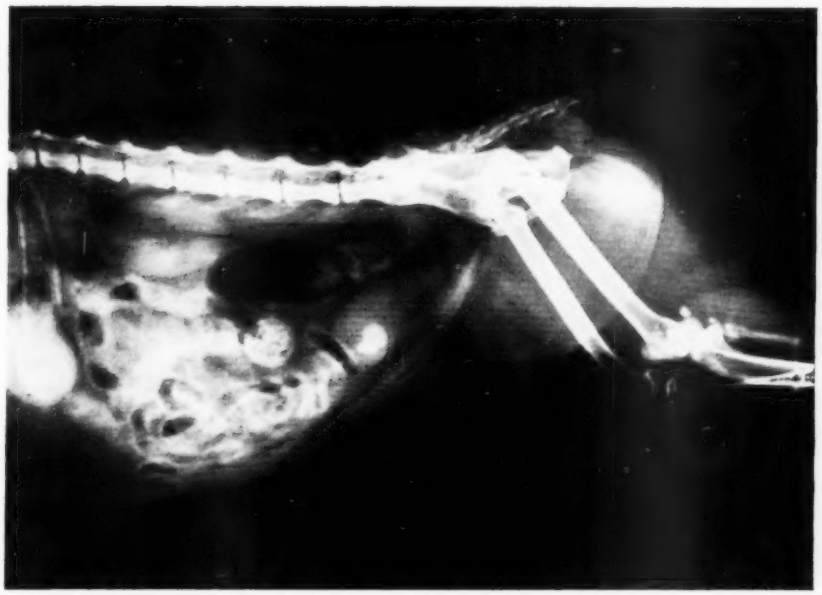

FIG. 1.—Lateral abdominal radiograph. Two cystic calculi are visible.

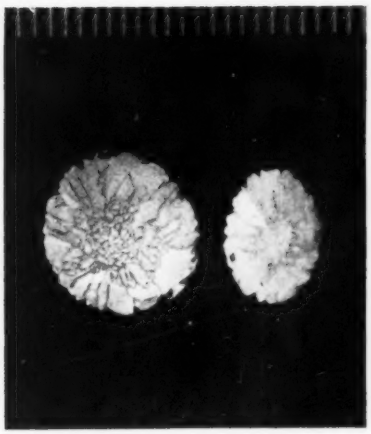

FIG. 4.—Cystic calculi. Magnification × 4.

FIG. 2.—Ventro-dorsal X-ray 10 minutes after commencing the injection of contrast medium. No abnormality other than the calculi can be detected.

FIG. 3.—Crystalline deposit obtained from the urine. Magnification × 120.

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L. C. VAUGHAN.—SOME ASPECTS OF INTERVERTEBRAL DISC PROTRUSION IN THE DOG.

FIG. 1.—A segment of lumbar vertebral column from a 5-month-old dog, in sagittal section. a = spinous process; b = spinal cord; c = dorsal longitudinal spinal ligament; d = dorsal annulus fibrosus; e = nucleus pulposus; f = vertebral epiphyseal line; g = ventral annulus fibrosus.

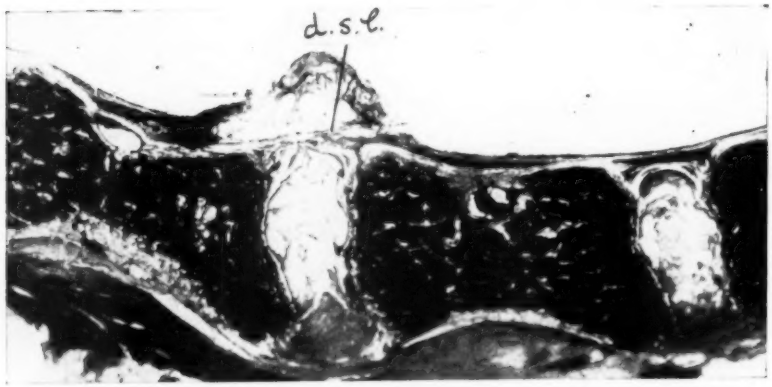

FIG. 2.—Sagittal section of spine at level of a 6/7 cervical disc protrusion. Note the intact dorsal spinal ligament (d.s.l.) in this section 1 mm. from the midline.
[Reproduced by courtesy of *The British Veterinary Journal*.]

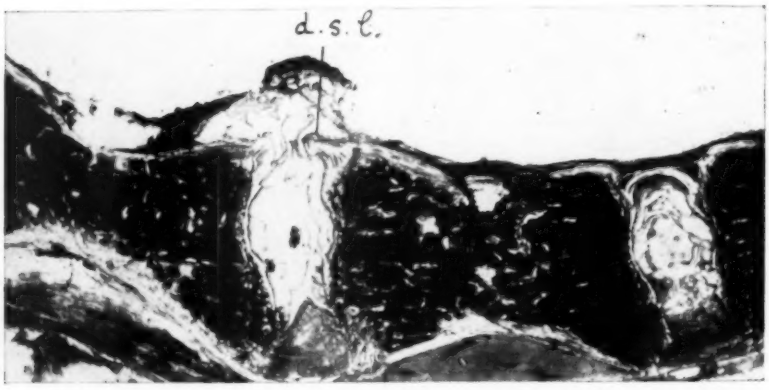

FIG. 3.—As for Fig. 2. Note ruptured dorsal spinal ligament (d.s.l.) and nucleus pulposus in communication with the protrusion.
[Reproduced by courtesy of *The British Veterinary Journal*.]

Current Literature

BOOK REVIEWS

Principles of Immunology. By JOHN E. CUSHING & DAN H. CAMPBELL. McGraw Hill Publishing Co. Ltd., New York, Toronto, and London. 97s.

The authors have set themselves the task of reviewing the enormous amount of information contributed by immunology in the last twenty years to the advancement of biological science in many different fields. The fact that the classical medical immunology is only in a small part of the subject matter will, perhaps, decrease its usefulness to the veterinary student. From the broad biological viewpoint, however, the book fills very efficiently a large gap in the literature available, and it should be a useful corrective to those who think of immunology only in terms of control of infectious disease.

The book is divided into 3 parts: a general survey of fundamental principles, a section entitled Biological Immunology, and finally a section on the nature of antigens and antibodies and their reactions. The first and last sections present a direct approach to general immunology, and the references provided are well calculated to lead the student into the more intricate aspects of the subject. It is, however, the section on biological immunology which is probably of most value to the student, in that it presents for the first time in any one place the information which immunology provides in such fields as genetics and embryological development. If there is a general complaint about this section it may be that some of the chapters, for example that on antigenic individuality, and the discussion of homografting and transplant incompatibility, might have been expanded. It would be out of place here to attempt minor criticisms of errors in the veterinary and medical immunology since the importance of the book lies in its general review aspect.

The Mind of the Dog. R. H. SMYTHE, M.R.C.V.S. Country Life, London, 1958. 18s.

The author of this book has made a brave attempt to cross the quicksands of opinion that divide the experimenting psychologist from the sentimental dog owner and not merely to describe, but to explain the behaviour of the dog in response to any given situation.

The measure of his success can be judged by the fact that he has produced a book which will interest both sides though possibly it will not fully convince either.

Inevitably in dealing with a subject about which so much remains conjectural, this book may be classified as a thesis written in popular terms rather than a text-book.

The first chapter gives a general introduction to psychology, a warning against anthropomorphism and the wise words of Lloyd Morgan: "Never assume a higher level of explanation than absolutely necessary and always interpret animal behaviour as the outcome of the more simple mental faculties." That warning, of course, goes for human behaviour too, especially on an emotional level.

Pack relationship and the entry of man into this social structure is next discussed, together with the wolf/jackal theory of origin in the development of the dog and the early differentiation into brachycephalic and dolichocephalic types.

The attempt to fit the characteristics of the modern breeds into this theory is not completely convincing as the author himself evidently realises.

The chapter on factors influencing behaviour is an admirable combination of a review of present knowledge and illustrative anecdote, and could be read with benefit by anyone who in the course of his profession, or hobby, chooses to handle dogs.

The special senses, eyesight, sense of smell, hearing, taste, etc., come in for fairly detailed discussion, though the tactile sense is oddly neglected. Does not the puppy after all learn his first movements from the touch of the bitch's nose and tongue? A sub-heading on the manifestation of the emotions also comes into this chapter.

Social behaviour is subdivided to deal with the relationships between dog and dog, dog and man and finally dog and other domestic pets within the house. Here it is Mr. Smythe's misfortune that Lorenz gave us such a brilliant word picture in "Man Meets Dog," for inevitably the reader tends to compare the two works, and it is no discredit to Mr. Smythe to say that a best seller is a hard example to follow with a book on the same subject.

The final chapter is on the female of the species, and the reader's only regret is that this is the briefest chapter of the book, for the field of study available between canine courtship and the rearing of a family could well supply material for an entire volume. Further, there is nowadays an unprecedented number of blissfully ignorant pet owners keeping bitches and breeding the occasional litter from them and adequate discussion of the problems involved in breeding from the pet, might benefit both the bitches and their owners.

Let us hope that Mr. Smythe may be encouraged to take on the task, or does he perhaps feel that the eternal mystery surrounding the female of the species is too much for his masculine pen?

Listeriosis. By E. ROOTES & D. STRAUCH (1958). Pp. 116, 15 figs. Paul Parey, Berlin and Hamburg. DM. 14.

This is a supplement to the "Zentralblatt für Veterinärmedizin" which consists of the papers given at a symposium on Listeriosis, held in Giessen in June, 1957. There are 11 papers; 9 of them in German and contributed by European workers and 2 in English by Dr. M. L. Gray of Michigan Agricultural Experiment Station, who was at the time a Fulbright guest professor at the Veterinary School in Giessen.

The papers deal with the morphological and cultural characters of *Listeria monocytogenes*, serological diagnosis, pathogenesis, and pathological anatomy of the disease in man and animals, and some studies on experimental infections. Each paper is followed by references to the literature and a short discussion. The supplement forms a useful con-

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tribution to the subject of Listeriosis in man and animals.

Radioisotope Laboratory Techniques. By R. A. FAIRIES and B. H. PARKS (1958). 244 pp., 91 figs., and 4 plates. George Newnes, Ltd., London. 25s.

As soon as politicians begin to take an interest in a scientific subject, truth and freedom from distortion tend to slip away from it as the whiteness of snow fades in an industrial suburb. By the time the press has finished reporting the politicians, it is small wonder that the general public, including not a few scientists, have little other idea of radioactivity than the H-bomb and Zeta in this generation and genetic horrors in the next. There are, as yet, no signs that the various atomic energy programmes will do anything except provide more of something that we have had in the past, namely, power: indeed, developments so far might, not unfairly, be described as the results of the lust for power. Just as, rather more than a century ago, most men were concerned with exploiting their newly found steam power, little dreaming of the effects that the " trivial " experiments of a Faraday might have upon succeeding generations, so now there seems to be too little appreciation of the way in which the use of radio-isotopes may affect knowledge in all its fields, not excluding veterinary medicine.

The present book is one in which the use of radio-isotopes in the laboratory is described. In being dangerous to the careless worker, radio-isotopes present no new problem. A bacteriologist, for example, by ignoring the accepted techniques could be a menace to himself and to others, but, with more or less difficulty, microbes that are out of place can nevertheless be destroyed or made harmless: there is no easy way out when radioactive material has been spilled. It may remain a menace to life until its natural activity has virtually decayed, a period which may range from minutes to thousands of years. There is an obvious need, therefore, for instruction in the careful handling of radioactive substances, and this book, written by two members of the Harwell Isotope School, is the result of several years' experience in teaching graduate students.

It does the job very well, beginning with short chapters on the physics of radioactivity and then getting down to 12 pages on health physics, *i.e.* on the biological activities of radio-isotopes and their implications for those who handle such substances. This may seem a very brief chapter on so important a subject, but the following chapters provide plenty of practical examples of the principles thus introduced. Indeed, Chapters 5 to 8 are concerned with the proper design of isotope laboratories, with the choice of apparatus and with the important problem of the disposal of radioactive waste. Chapters 9 to 16 then deal with the methods, purely physical, of detecting and measuring amounts of radio-isotopes; this is the linchpin of radio-isotope work. For biologists these chapters may be too brief and too condensed: if so they may be followed or supplemented by the additional reading that is suggested. The final chapters deal very briefly with examples of the applications of radio-isotopes. Though it suffers from some of the slight faults of severe condensation, the book is useful and to be commended.

It deserves to be read also by those concerned with research policy in Britain. Since 1945 the Americans have not thought it necessary to confine their activities to hydrogen, carbon, phosphorus, and (shades of atomic fall-out!) strontium-90. Many of them have worked with other elements and with creatures bigger than rats. But where are the facilities for biological investigation with farm animals in Britain?

The U.F.A.W. Handbook on the Care and Management of Laboratory Animals. Edited by ALISTAIR N. WORDEN and W. LANE-PETTER. 2nd Edition. Published by U.F.A.W., London, 1957. Pp. 957 + xix. Distributors: E. & S. Livingstone Ltd., Edinburgh. 70s.

During the ten years that have elapsed since the first appearance of the U.F.A.W. Handbook so many developments have occurred in the approach to the management and use of laboratory animals that a second, much enlarged and revised, edition has been prepared to meet the demand of new advances.

In the present work which is jointly edited by A. N. Worden and W. Lane-Petter, the specialised knowledge of nearly 90 contributors has been condensed into one volume. The result is a well-balanced book of reference which will be of immense value to laboratory workers and others interested in the welfare of a wide variety of animal species.

The book is in two parts. Part I—General Considerations—deals with topics common to all species, *e.g.* legal aspects, housing, hygiene and disease control, breeding, nutrition, and administration, etc. This section is most informative and much of it will be of particular value to the younger worker inexperienced in the use of experimental animals.

Part II, the largest section of the book, extends to some 700 pages and is devoted mainly to the detailed consideration of over 50 species of animals classified under the following heads: Rodents and Lagomorphs, Primates, Marsupials, Carnivores, Ungulates, Insectivores, Birds, Reptiles, Amphibia and Fish, and Invertebrates. Many animals not dealt with in detail in the first edition are now given fuller treatment, *e.g.* the dog, cat, sheep, goat, horse, and pig. A chapter of short notes and references to less commonly used animals completes Part II.

This edition like its predecessor will be constantly used by all engaged in problems connected with laboratory animals. The practising veterinary surgeon will find it a most useful source of information when confronted with patients outside the usual run of domesticated species normally dealt with. Such minor imperfections as the book possesses are due to the inevitable time-lag between preparation and publication.

The book is well produced, copiously illustrated by photographs, diagrams, and charts, and has a good author and subject index.

The editors, the various authors, and the publishers are to be congratulated on producing a comprehensive and authoritative manual which maintains throughout a humane and practical outlook.

REPORT

Annual Report of the Department of Veterinary Services of the Northern Region of Nigeria, 1955-6.

Of the three Regions into which Nigeria is divided the Northern Region is by far the largest and most important stock raiser. Its cattle, sheep, and goats are counted in millions and in a foreword to the Report Mr. Mallam Isa Kaita, the Minister of Natural Resources, appropriately comments on the important part they play in the economic life of the Region. Some idea of just how important the livestock industry is can be gained from the fact that, besides meeting all the demands of the local meat markets, it provided exports in 1955-6 worth nearly £8,000,000. The veterinary department's large contribution to this welfare is readily apparent from its Annual Report, which contains concise information on livestock diseases, animal industries, and livestock improvement in the colony. During the year under review the Department also became, for the first time, an important revenue earner, collecting over £66,000 in fees of various kinds.

Livestock Diseases

Trypanosomiasis continued to remain the most important disease on schedule, and as all treatments are given under the direct supervision of senior staff this disease imposes an ever-increasing burden on the Department. The number of cattle presented for treatment more than quadrupled during the previous 3 years to over 400,000 head in 1955-6. Ethidium bromide and antrycide are used, the former being the drug of choice for the nomadic Fulani cattle.

Rinderpest showed little change in incidence and only one of the 12 Provinces was entirely free of the disease. Nearly 400 outbreaks, involving approximately 40,000 cattle and resulting in a mortality of nearly 11 per cent., were reported. Inoculation with dried goat virus prepared at the Federal Veterinary Research Laboratory at Vom of approximately 13 per cent. (880,700 head) of the cattle population kept the disease in check. Complete eradication is, however, still far away. 430,900 trade cattle were also inoculated with D.G. virus.

An outstanding feature was the very marked decline in the number of bovine pleuro-pneumonia outbreaks diagnosed (64) and by the end of the year the disease was of economic importance only in Bornu Province. When judged against the difficulties of diagnosis and control—in this regard the uncertainty of the stained antigen and the reputed poor quality of the culture vaccine are remarked upon in the Report—and the temptations to Fulani cattle owners for concealment of the disease this advance is all the more creditable.

Foot-and-mouth disease occurred in 4 Provinces and at one time gravely threatened the cattle export trade. An outbreak also occurred in a piggery of 12,000 pigs; all became affected but despite serious lesions, mortality was less than 1 per cent. and recovery rapid. This is stated to have been probably the first record of foot-and-mouth disease in pigs in Nigeria. Both the cattle and pig viruses proved to be Vallee "O" type.

Although blackquarter is still one of the most serious diseases affecting cattle in Northern Nigeria, there was an encouraging decrease in the number of outbreaks recorded (76). Anthrax, haemorrhagic septicaemia, and tuberculosis also occur but are of less importance. Although a considerable number of abortions in nomadic cattle have been reported brucellosis has not so far been incriminated; trypanosomiasis is believed to be a more likely cause.

In sheep and goats the most serious economic loss is due to helminthiasis which causes much debility and mortality in both young and adult animals, particularly towards the end of the rainy season. Helminth surveys revealed, as on previous occasions, *H. contortus* and *T. colubriformis* as the most frequent pathogens. A list of the helminths identified is contained in the Report.

Babesia infections are common in both cattle and dogs. Cattle spraying is not, however, proving popular with the Fulani tribesmen and consequently there was little advance in tick control.

Rabies was confirmed in 22 dogs and one cat. Campaigns were waged against stray dogs in several centres, but the call for anti-rabies vaccine was disappointingly small, only some 700 doses being used in the whole Region.

Although statistics on their incidence are unreliable poultry diseases are obviously responsible for much economic loss—in one Province at least 75 per cent. of the poultry population is estimated to have died during the year!—and offer a large field for investigation. It is therefore heartening to read that the establishment of a poultry laboratory was in hand and soon to be in operation. Newcastle disease, fowlpox, and spirochaetosis are believed to be mainly responsible for most of the mortality; fowl typhoid and fowl cholera are as yet of undetermined significance. The call for veterinary aid in poultry diseases was ridiculously small, only about 56,000 vaccinations against 4 major diseases being carried out during the year.

Animal Industries

The export of cattle, dried meat, and hides and skins made a noteworthy contribution to the Region's economy. Cattle and dried meat are exported to the Eastern and Western Regions; no mention is made in the Report of the destination of the hides and skins. The estimated value of all exports totalled nearly £8,000,000, comprising 276,200 cattle (£4,143,000), 8,750 tons of untanned hides and skins (£2,866,000), and some 3,000 tons of dried meat (approximately £825,000). Several new control posts were established and other improvements to facilities on trade routes were made during the year.

It is stated that some 1,300,000 cattle, sheep, and goats were slaughtered for meat markets. There appears, however, to be a discrepancy between these figures and the much larger slaughter returns quoted in the hides and skins export statistics on page 16 of the Report.

(*Concluded in col. 1 overleaf*)

XUM

News and Comment

KENNEL CLUB RULING ON ENTIRE DOGS

As we have previously reminded our readers, the Kennel Club's new Show Regulations, which cover the subject of entire dogs, come into force on January 1st next. It is felt that a note on the background of this matter may be of interest, illustrating as it does the way in which a course of friendly negotiation between the B.V.A. and an outside body can be to the common advantage.

Since 1924 there has been in existence a Kennel Club directive to the effect that monorchidism and cryptorchidism should not be penalised by judges in making awards, but in 1953 the Society of Women Veterinary Surgeons wrote to the B.V.A. as follows:—

> "This Society views with concern the recent decision by the Kennel Club not to change its attitude to the exhibition of monorchid and cryptorchid dogs. In view of the increasing prevalence of this unsoundness in certain breeds, this Society asks the British Veterinary Association to take this matter up with the Kennel Club with a view to recommending to that body that a condition of monorchidism or cryptorchidism should be a ground for rejection of exhibits by veterinary surgeons carrying out the veterinary inspection at shows."

The Technical Development Committee was asked to discuss the subject and later a meeting was arranged between representatives of the B.V.A. and representatives of the Kennel Club. The Club invited the B.V.A. to present a memorandum which the Committee of the Kennel Club could consider.

While these exchanges were taking place the American Kennel Club and the German Kennel Club, which are affiliated to the British Kennel Club, prohibited the showing of monorchid and cryptorchid dogs. During this period also the Kennel Club legislated against the export of dogs so affected, which action safeguarded overseas buyers.

At a later date the Eastern Counties Veterinary Association noted with concern the apparent increase in the number of cases of cryptorchidism, particularly among pedigree dogs, seen by veterinary surgeons in general practice. The B.V.A. then had further discussions with the Kennel Club in which they made it clear that while scientific test matings had not been carried out it was accepted by the whole profession that the conditions of monorchidism and cryptorchidism were hereditary.

There followed a considerable amount of discussion, both formally between the two bodies and informally between veterinary surgeons and members of the Club, with the result that the Kennel Club decided that as from January 1st, 1959, dogs which were not entire should be ineligible for exhibition at shows. In the late spring of this year the Kennel Club republicised their Regulation which forms No. 2 of the Regulations for the Preparation of Dogs for Exhibition. The wording of which is as follows:—

> "No cutting, piercing, breaking by force, or any kind of operation or act which destroys the tissue of the ears or alters the natural formation of a dog or any part thereof may be practised and nothing may be done calculated in the opinion of the Kennel Club Committee to deceive, except: (a) operations certified to the satisfaction of the Kennel Club Committee to be necessary; (b) the removal of the dewclaws of any breed; (c) the shortening of tails of the following breeds," etc.

Our readers will thus appreciate that it was their own Association which promoted this matter, and the B.V.A. is indebted to the Kennel Club for its careful and sympathetic consideration of the subject. The Association would like to urge all members of the profession to support the new ruling, not only when they are judging at shows but if they are approached with the request to operate upon dogs which are not entire. They should perform this operation only in the interest of the dog's health and well-being and on no account accede to the wishes of a client who has in mind to show the dog. Operating in such a case would be both unethical as being calculated to deceive, and would lay the owner open to complaint under Kennel Club Rule 17. As a precaution owners should be advised to notify the Kennel Club if, for reasons mentioned above, a veterinary surgeon agrees to operate.

Report—*Concluded.*

Livestock Improvement

Three investigation centres were maintained at Bulassa, Katsina, and Biu at which research into the husbandry, diseases, and improvement of the Red Sokoto goat, Ouda sheep, and Gudale, Red Rahaji, and Ketuku cattle was carried out, as well as work on the establishment and management of different pastures. At two of the centres work on poultry also received attention.

The Report contains some helpful descriptions and photographs of Nigerian horses. Although they are roughly classified into three main groups, (a) the Dongola type originating from the Sudan and the Chad area, (b) the Arab-Barb from the North African coast, and (c) the smaller pagan ponies of entirely unknown origin, it is pointed out that planned breeding has been the exception rather than the rule and that the vast majority of Nigerian horses consist of mixtures of these three main groups.

The Report is a modest account of the splendid work the Director of Veterinary Services, Dr. S. G. Wilson, C.B.E., and his staff are performing for the welfare of the native peoples of the Region. They can take heart from the words of their African Minister who writes, "That the importance of animals to the people of the Region is becoming more widely recognised is shown by the popularity of cattle inoculations and the evident anxiety of cattle owners to take advantage of modern methods of treatment."

The addition of a map of the Region would have been helpful to a reader unfamiliar with the country, while the inclusion of a livestock census, a statement of departmental personnel strength, and expenditure and revenue returns would also further assist in assessing the importance of the Department to the Region.

W. E. L.

THE ISLE OF MAN
is full of fine natural scenery and Congress delegates will see many beauty spots like these. On the left is Sulby Glen, and on the right, part of Mooragh Park

INFORMAL DINNER TO AGRICULTURAL JOURNALISTS

What has become a pleasant tradition within recent years was honoured on September 12th when the Officers of the B.V.A. entertained senior agricultural journalists to dinner at the Dorchester. Most of the principal national newspapers were represented, as were also the B.B.C., the agricultural journals, and the news agencies. In addition to the Officers there were present Dr. W. R. Wooldridge, Dr. F. R. Bell, Mr. S. L. Hignett, Mr. A. J. Wright, and Mr. Roger Massey.

The President welcomed the guests, and the representative of *The Times* replied. The whole occasion passed off in a most cordial atmosphere, further cementing the good relationship between the Association and the journalists—a relationship which has been exemplified in practical terms in the handsome amount of publicity given to annual congresses for several years past, and on other occasions.

R.C.V.S. OBITUARY

We record with regret the death of the following member of the profession:—

MASSON, Charles, Sunshine Cottage, Jordan, Newton Abbot, Devon. Graduated Royal (Dick) School of Veterinary Studies, Edinburgh, May 17th, 1911. Died September 15th, 1958, aged 69 years.

PERSONAL

Dr. A. T. Phillipson was awarded the degree of Doctor of Veterinary Medicine, *honoris causa,* at the Centenary celebrations of the foundation of the Royal and Agricultural College of Denmark.

Births

COOPER.—On August 25th, 1958, to Pauline, wife of B. S. Cooper, M.R.C.V.S., of Hill Farm House, Thurgarton, Nottingham, a son, Paul Martin.

SAINSBURY.—On September 4th, 1958, at 23, Leys Road, Cambridge, to Ursula, wife of D. W. B. Sainsbury, M.A., PH.D., M.R.C.V.S., a daughter, Elizabeth Jane, a sister for Richard and Fay.

Engagement

HILLER—WOOLDRIDGE.—The engagement is announced between Roger George Hiller, younger son of Mr. and Mrs. G. A. Hiller, and Sylvia Rosalie Wooldridge, daughter of Dr. and Mrs. W. R. Wooldridge.

Marriages

BRADLEY—ELLIOT.—On August 9th, 1958, at the Congregational Church, Whitley Bay, John Edwin Bradley, B.V.M.S., M.R.C.V.S., of Durham, to Jean Elliot of Whitley Bay, Northumberland.

CHRISTIE—MORLEY.—On September 3rd, 1958, at the Parish Church, Melbourne, Ronald Forbes Christie, B.SC., M.R.C.V.S., to Carol Ann Morley of Kings Newton, Melbourne, Derbyshire.

COMING EVENTS

September

21st to 26th (Official Opening, Monday, September 22nd). 76th Annual Congress of the British Veterinary Association in Douglas, Isle of Man.

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23rd (Tues.). General Meeting and Dinner of the Royal (Dick) School of Veterinary Studies Alumnus Association at the Villiers Hotel, Douglas, I.o.M., 6 p.m.

24th (Wed.). Informal luncheon of the Horseshoe Club at the Castle Mona Hotel, Douglas, Isle of Man, 12.30 p.m.

27th (Sat.) Symposium on "Nutritional Hazards caused by Radioactive Contamination of Foods" by the Scottish Group of the Nutrition Society in Edinburgh.

30th (Tues.). Meeting of the B.S.A.V.A. (Midland Region) at the Swan Hotel, Stafford, 7.30 p.m.

October

1st (Wed.). Meeting of the Welsh Branch in the Cambrian Hall, Swyddfa'r Sir (County Offices), 2.15 p.m.

2nd (Thurs.). General Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

4th (Sat.). R.A.V.C. Old Comrades' Association Annual Reunion and Dinner, Bridge House Hotel, London Bridge.

9th (Thurs.). Meeting of the Ayrshire Veterinary Association in the Ailsa Lounge, 2.30 p.m.

10th (Fri.). General Meeting of the Midland Counties Veterinary Association at the Ministry of Agriculture Veterinary Investigation Centre, Block C, Government Buildings, Redhill, Worcester, 2.45 p.m.

14th (Tues.). Dinner-Dance of the Mid-West Veterinary Association at The Berkeley Café, Clifton.

15th (Wed.). Meeting of the Southern Counties Veterinary Society at the Royal Hotel, Winchester, 7.30 p.m.

16th (Thurs.). General Meeting of the Herts and Beds Veterinary Society at the Peahen Hotel, 14, London Road, St. Albans, 7.30 p.m.

17th (Fri.). Meeting of the Lincolnshire and District Division at the George Hotel, Grantham, 2.15 p.m.

General Meeting of the Mid-West Veterinary Society at the Berkeley Café, Clifton, Bristol, 2.15 p.m.

22nd (Wed.). Meeting of the R.A.V.C. Division at the Home of Rest for Horses, Boreham Wood, Herts., 11 a.m.

23rd (Thurs.). Dinner-Dance of the Yorkshire Veterinary Society at the Cairn Hydro Hotel, Harrogate.

31st (Fri.). General Meeting of the Yorkshire Veterinary Society at the Hotel Metropole, Leeds.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Lancs. Bradley Hall Farm, Great Harwood, Blackburn (Sept. 9).

Fowl Pest

Norfolk. Drury Square, Beeston, King's Lynn (Sept. 9); 8, Watton Road, Hingham, Norwich (Sept. 11).

Swine Fever

Caernarvon. Tanycoed Nantygamer, Llandudno (Sept. 9).
Dorset. Mushroom Factory, Blandford Farm, Products, Upper Shaftesbury Road, Blandford Forum (Sept. 10); Moorland Lodge, Old Wareham Road, Parkstone, Poole (Sept. 11).
Essex. Stubbs Lane, Braintree; Stapleford Hall Farm, Stapleford Abbotts, Romford (Sept. 11).
Hants. The Old Vicarage, Vicarage Lane, Hordle, Lymington (Sept. 9).
Lancs. Springfield, Little Tongues Lane, Preesall, Fleetwood (Sept. 9).
Norfolk. Church Farm, Winfarthing, Diss (Sept. 10).
Northants. South View, Welford Road, Boughton; 10, Murswell Lane, Silverstone, Towcester (Sept. 9).
Somerset. Racecourse Farm, Portbury (Sept. 10).
Stirling. 32, Elliott Place, Bainsford, Falkirk (Sept. 10).
Suffolk. Church Farm, Bruisyard, Saxmundham (Sept. 9); Archway House, Playford, Ipswich (Sept. 11).
Warwicks. Briar Farm, Southam, Rugby (Sept. 10).
Yorks. Calvis Hall, Thirsk (Sept. 10); Crowtrees Farm, Birstwith, Harrogate (Sept. 10).

INTERNATIONAL WORKSHOP ON FARM MANAGEMENT

Starting on September 22nd, and lasting for 12 days, an international workshop will be held at Nottingham University School of Agriculture in order to discuss and review progress in farm management advisory work in European countries. It has been organised by the European Productivity Agency of O.E.E.C. and it is expected that up to 40 experts will attend from O.E.E.C. member countries, together with observers from certain other international organisations interested in this field of work.

The workshop will be officially opened on behalf of the United Kingdom Ministry of Agriculture, Fisheries and Food by Mr. H. Hardman, Deputy Secretary of the Ministry.

At the workshop delegates will study and discuss techniques of farm business analysis and planning; the use of farm accounts and records for providing management standards and efficiency measures; and ways in which advisory services can propagate good farm management practices among farmers.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

SCIENTIFIC

The Control of Cobalt Deficiency in Sheep by Means of a Heavy Pellet

Sir,—For many generations pining due to cobalt deficiency has been a serious problem in certain well-defined areas of the West Coast of Ireland (O'Moore, 1952; Walsh *et al.* 1956). The " affected " grazings are of two contrasting types (a) calcareous sandy pastures of the coastal strip and tidal islands and (b) acid peat pastures of the hillsides. The traditional method of curing or of preventing pining has been the systematic transfer of stock from " affected " pastures to those reputed to be curative. Within the past 10 years farmers have learned of the inter-relationship of cobalt deficiency and pining and many now control the condition either by the oral administration of aqueous cobalt solution at brief intervals or by the application of a cobalt salt to the soil. Experimental work has shown the benefits and the limitations of each method of prophylaxis (O'Moore, 1957).

Oral dosage to be effective must be carried out at brief intervals, *e.g.*, weekly or forntightly. The time and labour involved in the frequent collection of animals scattered over a wide area makes this an impracticable method of control in hill flocks. Top dressing with a cobalt salt of a number of small plots situated strategically has proved an excellent method of control on mountain grazings. In practice, however, this method is applicable only in the case of a farmer who owns the " divide " of hilllside over which he runs his sheep. Flockowners who run their sheep on commonland do not top dress with cobalt, but rely on change of pasture coupled with infrequent oral dosing.

Top dressing is not to be recommended as a method of control on highly calcareous sandy pastures in coastal areas where gross excess of calcium carbonate in the soil may limit the uptake of cobalt by the grazing herbage. Under such circumstances drenching with aqueous cobalt solution at brief intervals has proved reliable as a prophylactic measure.

Recently Dewy, Lee and Marston (1958) have reported the long term effectiveness in preventing cobalt deficiency in sheep by dosing with a heavy pellet containing cobaltic oxide. After administration the pellet remains in the forestomachs (more commonly in the reticulum) and allows the release of sufficient cobalt for the nutritional requirements of the animal.

In November last it was made possible for us to test the efficacy of the cobalt pellet in preventing the occurrence of marasmus under conditions of severe cobalt deficiency. A grazing on a calcareous sandy soil (pH ca 7.5) was selected on account of a high incidence of pining in sheep for many years past. The level of total cobalt in hebage samples was extremely low, *i.e.* < 0.04 p.p.m.

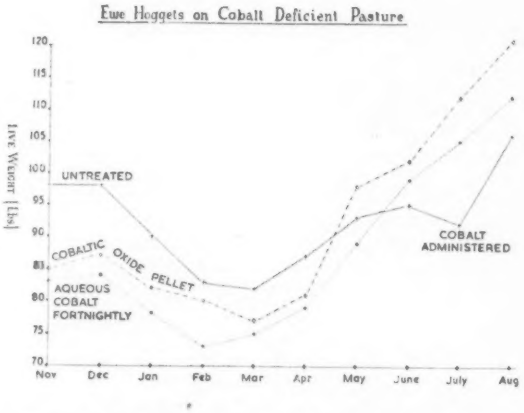
Thirty Suffolk X Cheviot ewe hoggets were brought to this grazing and divided into 3 groups; each animal was ear-tagged and received anthelmintic treatment.

Group 1. Each hogget received a single cobalt pellet (" Permaco " containing 90 per cent. cobaltic oxide) at the beginning of the experiment in November.

Group 2. Each hogget received 70 mg. of cobalt (Co) in aqueous solution at fortnightly intervals throughout the experimental period.

Group 3. The hoggets in this group which were initially heavier and stronger than those in Groups 1 and 2, received no cobalt supplementation.

The experimental period extended from mid-November 1957 until mid-August 1958 and during this period the animals were weighed monthly and received anthelmintic treatment on 4 separate occasions. The liveweight increases are shown in the accompanying graph.



From April onwards the hoggets in Group 1 which had received a single pellet at the beginning of the experiment showed significant increases in liveweight over those in Group 2 which were dosed with a relatively large amount of cobalt at fortnightly intervals throughout the experimental period ($P < 0.05$).

By mid-July, 4 members of Group 3 were showing obvious symptoms of pining. These recovered rapidly following cobalt therapy.

In this trial administration of a single pellet provided the cobalt requirements for health and production of sheep maintained on cobalt-deficient pasture over a period of 9 months. This method of prophylaxis has the advantage in a saving of the time and labour involved either in frequent gathering of the flocks for drenching or in transporting cobalt over the hillsides for top dressing.

XUM

We are indebted to Messrs. J. Denneny and J. McGrath for their assistance in the field.

Yours faithfully,
L. B. O'MOORE,
P. J. SMYTH.

Biochemistry Division,
Veterinary Research Laboratory,
Department of Agriculture,
Dublin.
August 20th, 1958.

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O'MOORE, L. B. (1952). *Vet. Rec.* **64**. 475.

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GENERAL

Induction of Anaesthesia using Pentobarbitone Intra-thoracically

Sir,—In the limited literature at my immediate disposal I can find no reference to producing anaesthesia in the cat or "toy" dog by the use of pentobarbitone intra-thoracically. A. R. Smythe, formerly of Falmouth, introduced me to this route of administration and I have used it unfailingly on each occasion when general anaesthesia was indicated.

The animal is restrained by grasping the loose skin of the neck in the left hand and firmly pressing the fore quarters and head towards the table, thus making it adopt a crouching position. The heart is readily palpated and the area behind swabbed with spirit. A half-inch 24-gauge needle is attached to the syringe and the injection (1 gr. per 5 lb.) given between the ribs; the needle is inserted almost fully.

If the injection is given midway between the ribs and the latter are avoided, no pain attends the injection and the only discomfort is slight sneezing in a small proportion of cases; obviously the needle had been inserted too far.

Surgical anaesthesia is present in 10 minutes, but a small proportion of cats will show marked excitement and it is advisable to place them in a basket or cage until anaesthesia is present.

This method may be well known, but to those single-handed veterinary surgeons who are unaware of it, I can definitely commend it.

Yours faithfully,
W. A. SCOTT.

49, Howbury Street,
Bedford,
August 30th, 1958.

Control of Milk Production—England and Wales

Sir,—As the final official word, for the time being, appears to have been said on the above—SUPPLEMENT to THE VETERINARY RECORD, Supp. 19, 4, page 145—I wonder if a reasonably frank report on what led to the rejection of the recommendation of the Arton Wilson Committee could be made available to those members really interested?

There must be something fundamentally wrong when, for the second time within 20 years, we have been prevented from undertaking a duty that so logically is ours, and a very thorough and impartial P.M. might allay or otherwise the suspicions of those who believe that the fault may not be altogether in our stars.

To Scottish members the happenings are of special interest in connexion with the findings of the almost forgotten Philips report, although we may take some encouragement from the fact that in the past our legislators have pursued a more enlightened path than those of the parent Parliament.

Yours faithfully,
JOHN C. GRANT.

Veterinary Department,
Marischal College,
Aberdeen.
September 8th, 1958.

Docked Horses

Sir,—I have noticed that there are still a large number of docked horses about. I have been under the impression that this operation has been illegal in this country for many years. At any rate, it is surely frowned on by the veterinary profession. Who, then, is doing it, and can they not be stopped?

Yours faithfully,
R. MACGREGOR.

Kildrummie,
Betchworth,
Surrey.
September 15th, 1958.

B.V.A. PUBLICATIONS

Readers may like to be reminded that a number of handbooks published by the Association are still available. Prices on request. The publications are as follows:—

"Husbandry and Diseases of Goats." 52 pp.

"Report of Grassland Conference, 1948." 114 pp.

"Report on Conference on the Feeding of Farm Animals for Health and Production, 1954." 204 pp.

"Report on Conference on Supplements and Additives in Animal Feeding-stuffs, 1956." 292 pp.

"Laboratory Aids to Clinical Diagnosis." 64 pp.

"Artificial Insemination of Cattle." 90 pp.

"Diseases of Sheep." 122 pp.

"Husbandry and Diseases of Pigs." 212 pp.

"Husbandry and Diseases of Calves." 92 pp.

A revised publication, "Parasitic Diseases of Cattle," will be completed later this year.

The Commercial Exhibition at Congress

The following information has been supplied by the Exhibitors

Arnold & Sons

Arnold & Sons' stand, as usual, will display both new equipment and a range of standard instruments as used in veterinary practice. A special feature amongst the new instruments is the Bagshawe Hoist, a simple appliance for raising recumbent cattle which can be used in byre or stable. A full range of artificial insemination equipment will be shown, and of particular interest is the new boar artificial vagina and insemination catheters. With the advent of hormone implantation for cattle, the new Magijector is of especial interest, having disposable plastic magazines which obviates the handling of implants. The new Plim syringe is also shown with the "Laminex" piston. This is available with interchangeable barrels, and replacement costs are now, of course, reduced to an absolute minimum. Among the more standard instruments is a complete range of modern auriscopes and ophthalmoscopes, equipment for small-animal surgeries, and samples of analgic needles. Arnold & Sons now have branches in Dublin, York, Edinburgh, Birmingham, Bath, Reading, Canada, and London, and we will be very pleased to welcome to our stand customers who normally deal with one or other of the branches and whom the London staff will have the pleasure of meeting for the first time.

Baillière, Tindall & Cox Ltd.

Baillière, Tindall & Cox, on stand No. 10, are showing a wide range of books on veterinary practice including all the standard text-books which they publish.

Among the recent new editions is *Veterinary Ophthalmology*, by R. H. Smythe, M.R.C.V.S., second edition, which contains much new material and additional illustrations. The first section of the book covers the anatomy and physiology of domesticated animals and a great variety of other species. The second section deals with the clinical and surgical aspects of animal ophthalmology.

Veterinary Anaesthesia, by Professor J. G. Wright, D.SC., M.V.SC., F.R.C.V.S., fourth edition, is a complete guide to anaesthetic agents, general and local, and covers the latest advances in this field. Their relative merits are discussed with detailed descriptions for their use, with carefully chosen illustrations.

Students studying for veterinary, agricultural, and biological degrees will find *A Handbook of Animal Physiology*, by E. M. Pantelouris, B.SC., PH.D., to be of considerable assistance.

Other interesting books are *Veterinary Clinical Diagnosis*, by Professor David Wirth. Originally written for use of the students at the Veterinary High School, Vienna, its scope has been extended and its text adapted to the requirements of English veterinary practice by the translator, Annie I. Littlejohn, B.V.SC., M.R.C.V.S. The illustrations are a special feature of this text-book—there is one to almost every page of the text.

Among the many other standard works are *Veterinary Toxicology* (formerly *Lander's Veterinary Toxicology*), now completely revised by R. J. Garner, M.A., M.V.SC., F.R.C.V.S., A.R.I.C.; the third edition of *A Text-book of Meat Inspection*, by H. Thornton, B.V.SC., M.R.C.V.S., D.V.H., F.R.S.H., and the fourth edition of *Mönnig's Veterinary Helminthology and Entomology*, revised by G. Lapage, M.A., M.D., M.SC.

The third edition of *Infectious Diseases of Domestic Animals*, by W. A. Hagan, D.V.M., D.SC., and D. W. Bruner, D.V.M., PH.D., has undergone a complete revision.

The publications of the Commonwealth Agricultural Bureau are also on display.

Bayer Products Ltd.

The Bayer motif is the research and normal production work carried out at their Biological Institute, near Newmarket, and the extensive facilities utilised for research on veterinary chemotherapeutics at their recently built Newcastle factory.

Products displayed include their new Roccal Pessaries, for the prevention of uterine disorders in the larger domestic animals. Being not only bacteriostatic but also bactericidal and having an effervescent base, they offer broad and very economical coverage. The widely used local anaesthetic Ravocaine and the newly introduced smaller Stredin 65 G. pack as well as the larger economical 360 G. pack are shown.

A wide range of biologicals such as vaccines and antisera currently required for sheep are prominently displayed. Those biologicals like Aggrecolin (*E. coli* serum), Aggrecovac (*E. coli* vaccine), Seavac (swine erysipelas vaccine), and Susserin (swine erysipelas antiserum) normally used throughout the year are also exhibited, together with White Scour Vaccine and Antiserum and *Pasteurella septica* Vaccine and Antiserum.

Flanking the biologicals are some of the widely used Bayer chemotherapeutics such as the analgesic Novalgin and the otitis externa preparation Tycine, to which has now been added gamma benzene hexachloride to provide parasitic coverage. The mineralised liver extract combination Hepmin, containing vitamin B_{12} for parenteral administration, and the specially formulated solution Pentimon brand of pentobarbitone sodium for short-acting anaesthesia, are also shown. The versatility and utility of preparations of Roccal, leader in the field of quaternary ammonium microbicides because of its high activity, is also demonstrated by its 10× solution for antiseptic and deodorant purposes together with Roccal Tincture and Roccal Cream.

Benger Laboratories Ltd.

The Benger stand features their latest iron prophylactic, Imposil. In the past Benger have concerned themselves with the health and well being of piglets and with this new product their policy is unchanged but because of the increased iron content (75 mg. per c.c.) they are now featuring the application of Imposil in mink, horses, sheep, dogs, cats, and cattle. Indication cards will be available on the stand.

The stand, which is of modern design, features the now famous Imposil pig as well as the various other animals which benefit from Imposil. The reception area shows the world distribution of this important Benger product.

Boots Pure Drug Company Ltd.

Boots are the largest manufacturers and suppliers of drugs, galenicals, and dressings in this country and some of the extensive range available through Boots representatives and branches is shown on the stand. All Boots galenicals and dressings are of British manufacture and natural and botanical drugs are of Empire origin where obtainable. All official preparations are guaranteed to comply with the requirements of the British Pharmacopoeia or British Veterinary Codex.

A method, designed to enable stock investment in veterinary practices to be kept to a minimum, is also prominently featured on Boots' stand. A unique stock-book is provided and designed to help veterinary surgeons with the ordering of their requirements and to prevent over and under stocking. It is simple and efficient and allows full advantage to be taken of the "one transaction" system. Explanation of this method is available to our interested friends.

Brookwick, Ward and Company

Among the Hauptner equipment shown on Stand 14 will be the following:—

Borelli's portable table, which is designed to assist operations in the field, is suitable for pigs and the smaller ruminants. In the surgery, it can be used for dogs, either in its extended or folded position. *Catalogue No. 4694m* (Supplement to Cat. A.).

XUM

A very complete bone-pinning set has been designed by Dr. E. Becker. The pinning is done extra-cutaneously. Metal sleeves are placed over the shafts of the pins, when they are in position. A quick-setting plastic material is moulded onto these sleeves to hold the pins rigidly in position. *Catalogue No. 2035.*

New rumenotomy forceps with extra wide jaws and with a very sharp hook on the side of each shaft is a development of Weingart's method with hooked frame and Blendinger's with several hook forceps. By the use of extra-peritoneal suturing, the operation can be carried out single handed and with a single pair of the new forceps. *Catalogue No. 3956.*

Oesophageal obstructions in dogs can often be successfully removed by using the new spiral wire probang, which has three opening jaws or "fingers" at the distal end. The instrument is so designed that it can be used to ease the obstruction into the stomach or extract it. *Catalogue No. 3493.*

A small but practical addition to the surgeons' equipment is the spiral "neck" spring for farrowing. Under the control of a running noose, the spring is easily introduced. It is positioned so that its rounded ends are situated directly behind the mandibles. *Catalogue No. 4412.*

Burroughs Wellcome & Co. (The Wellcome Foundation Limited

All products featured on the Burroughs Wellcome stand No. 15 have been recently introduced for the control of certain sheep diseases.

Special prominence has been given to Frantin, the product which proved to be of outstanding value in controlling the widespread outbreaks of nematodiriasis which occurred during the year. Frantin, which contains 90 per cent. bephenium embonate, had already been shown experimentally to be effective on killing the larvae and adult worms of Nematodirus species. These findings have now been fully confirmed by this season's experience in the field.

Also shown is the new Improved Lamb Dysentery Vaccine which can be used in breeding flocks to protect lambs against lamb dysentery and pulpy kidney disease and the older sheep against pulpy kidney disease and "struck."

An additional combined vaccine, Trivexin, is being displayed. This has been prepared to protect against braxy, blackleg, and pulpy kidney disease especially in areas where all three diseases are prevalent.

Cooper, McDougall & Robertson Ltd.

As on previous occasions the Cooper stand features two distinct displays. The back panel illustrates two of the most popular products in the Cyanamid Aureomycin veterinary range—Aureomycin Soluble Oblets now widely used by veterinarians for the prevention and treatment of uterine infections; treatment of *Vibrio fetus* infection in cattle. Aureomycin Soluble (Tinted) chiefly used for the prevention and treatment of scours in swine and calves.

The Cooper display panel is in two parts featuring (a) the new non-toxic insecticidal formulation Veterinary Insecticide (Pybuthrin) which has been designed primarily for dry application to cats. The "puffer" tube dispensing presentation ensures easy application; (b) "fine particle size" Phenothiazine—this new formulation as "plain" or "mineralised" dispersible powder gives the greatest efficiency against several species of intestinal worms, Trichostrongylus, and Ostertagia in ruminants.

Elga Products Ltd.

The company produces deionisers for the production of conductivity water. Their action is instantaneous, the effluent being similar to that obtained by 3 distillations in quartz.

The Elgastat Multiplan type B.107 will be demonstrated at the Exhibition. This is a self-contained unit for the execution of all known ion exchange and deionisation processes met in the laboratory.

Some current uses are recovery of metallic ions from solution; separation of rare metals; purification of organic compounds including vitamins; the isolation and concentration of pharmaceuticals. Additionally the unit can be used for the provision of mixed bed or two-bed column deionised water.

A conductivity meter is provided for effluent check. Ion exchange resins for the execution of the processes outlined above are available.

Evans Medical Supplies Ltd.

The Evans Medical Supplies stand features products of original research which have been recently developed and introduced. These include:—

Trypvet Novo, a proteolytic enzyme for enzymatic debridement. Extensive field trials and laboratory evidence indicate the usefulness of this form of treatment in indications ranging from bovine mastitis to foot abscess.

Dermevan, the first iodophor to be made available to the veterinary profession in Great Britain. Dermevan consists of iodine solubilised with a special surface active agent in such a manner that 82 per cent. of the iodine is immediately available for biocidal action. It is presented as a 1 per cent. solution in bottles of 16 oz. Being bactericidal, virucidal, and also effective against fungi, its indications are widespread. Undiluted it has been found effective in the treatment of foot-rot in sheep, ringworm in cattle, and in the treatment of interdigital cysts in dogs. At high dilutions it remains effective as an excellent antiseptic and detergent agent for the preparation of operation sites and the sterilisation of surgical equipment and instruments.

Improved Lamb Dysentery Vaccine. Since its introduction last year this product has aroused considerable interest.

An interesting and convenient new packing for Calcium Borogluconate injections and other transfusion solutions is on display.

W. Gimber & Sons Ltd.

Stand No. 6—that of W. Gimber & Sons Ltd., 2, Queens Road, London, S.E.15—will be exhibiting veterinary and surgical instruments, equipment, and sundries, together with a selection of pharmaceutical products and ligatures manufactured by the Armour Laboratories Ltd., Eastbourne, Sussex.

Amongst many items of special interest will be the new fibre glass cage and cat box which have now been fully developed, and the Everett Interchangeable Syringe.

Also displayed will be the latest veterinary ether/oxygen anaesthetic apparatus, complete with the Hall's mask, and the complete range of "Ames" Tablets, etc., for routine urine tests.

A wide variety of British and Hauptner made instruments will be included, and all those visiting the Exhibition will observe what a large and comprehensive range of veterinary equipment is now obtainable from the Company.

Glaxo Laboratories Ltd.

Most interest on the Glaxo stand—No. 18—centres around 4 recently introduced products. They are Biotexin, latest Glaxo cerate; Saffelin, pulpy kidney vaccine; Erysilin swine erysipelas vaccine, and the latest Glaxo corticoid Predsolan. Also on view are the complete ranges of Glaxo intramammary preparations and corticoids together with 3 well-known antibiotic injections, Crystapen, Mylipen, and Dimycin.

First of the new products, Biotexin, is recommended for use against problem cases of mastitis. Already it has proved its worth against staphylococcal mastitis. Biotexin owes its effectiveness to the new antibiotic it contains, novobiocin, presented in the special base which ensures good distribution in the udder.

The experience of many years spent in vaccine research and production have been put to good use by Glaxo in producing Saffelin and Erysilin. Saffelin is a highly purified, virtually protein-free toxoid for pulpy kidney immunisation. The colour of the vaccine testifies to its purity and accounts for the reduced risk of reactions

after use. Saffelin is trouble-free in all types of syringes and is indicated for flock protection from pulpy kidney. The other vaccine on show, Erysilin, is a unique, emulsified, killed swine erysipelas vaccine proved in tests on thousands of pigs to be safe, easy to administer, and above all reliable.

C. J. Hewlett & Son Ltd.

The main exhibit comprises 3 individual displays presenting veterinary specialities marketed by the House of Hewlett for the treatment of milk fever, acetonaemia, and mastitis respectively.

The *Milk Fever* display consists of the established Calcium Porogluconate Injections P., P.M., P.M.D., M., Duophos, and Calcium Borogluconate P.M.29, a complex injection with a higher calcium content. These injections are easily differentiated by distinctive coloured capping rings.

The *Acetonaemia* display presents the standard dextrose and magnesium injections, also A.D.M., containing both magnesium and dextrose, and a mineralised propionate powder Proketin. The advanced hormone treatments are represented by Cortrophin Z (long-acting ACTH) and Di-Adreson-F (prednisolone) of Organon Laboratories and Deltacortril (prednisolone) of Pfizer Ltd.

The *Mastitis* display includes products representative of all aspects of mastitis treatment, penicillin 100,000 and 300,000 units for routine treatment, I.P.S. (penicillin/sulphadimidine) and Distropen (penicillin and dihydrostreptomycin) for penicillin-resistant organisms, and Terramycin of Pfizer Ltd., as a broad-spectrum therapeutic. Nebacetin Teat Bougies (plastic cannulae medicated with bacitracin and neomycin) for the treatment of teat conditions are presented in three sizes to meet varying requirements.

Imperial Chemicals (Pharmaceuticals) Ltd.

This year Imperial Chemical Industries Limited Pharmaceuticals Division are showing a wide range of specialities which will be of great interest to all veterinary surgeons.

Amongst them will be found such well-known products as Sulphamezathine—still the best and the cheapest sulphonamide for veterinary use—available as Sulphamezathine Sodium 33⅓ per cent. Solution, for injection, and Sulphamezathine Tablets 5 gramme, for convenient sulphonamide treatment of sheep. The ever-popular Avloprocil A.S., procaine penicillin ready for injection, is prominently featured. So too is Stromez—a special combination of therapeutic doses of Sulphamezathine, streptomycin, and kaolin—which provides the simultaneous local and systemic treatment so essential for the efficient control of scour and enteritis.

Dispolac P and P.S.—rapidly dispersible intramammary creams—are of special interest. They not only give rapid and efficient distribution of penicillin throughout the duct system and parenchyma, but also ensure that after 36 hours, when the antibacterial effect of the antibiotic in the udder is probably insignificant, penicillin milk levels rapidly fall to zero.

Another product meriting particular attention is Dictycide, the new specific treatment for lungworm which can be given safely and easily by subcutaneous injection. Helmox, which is also featured, presents the drug for oral administration and may be used alone or as a supporting treatment following Dictycide.

Literature and information are also available describing the recently introduced Super Concentrate of I.C.I. Udder Wash. Containing Hibitane, I.C.I. Udder Wash is widely recognised as the most effective preparation available for preventing the spread of contagious mastitis.

May & Baker Ltd.

Pharmaceutical Specialities (May & Baker) Ltd. display a representative selection of their products, amongst which the following drugs are prominently featured:—

Largactil brand chlorpromazine hydrochloride continues to be of special interest as a premedicant and sedative, as well as for the control of nausea and vomiting, particularly during transportation. This drug has a remarkable and extending range of indications.

More recent introductions include:—

Versicaine brand lignocaine hydrochloride has recently been made available as solutions both with and without adrenaline for the conduct of local regional, and epidural anaesthesia; and also in the form of a topical solution for application to the cornea, painful abraded surfaces, etc.

Lenticillin brand procaine benzyl-penicillin suspension is most suitable for treatment where there is moderate infection by penicillin-susceptible organisms, and where it is desirable that the release of the antibiotic from the site of injection is gradual.

Strypen brand penicillin and dihydrostreptomycin, given as an intramammary injection, is specially suitable for those cases of mastitis in which penicillin-insensitive, as well as penicillin-sensitive, organisms are present. The combination of the two antibiotics gives an enhanced effect since there is some degree of synergism between them.

Stryzolin brand streptomycin sulphate solution is recommended where the disease is caused by gram-positive organisms as in pyosepticaemia in foals, or complications of canine distemper.

Vesadin brand injection of sulphadimidine sodium B.Vet.C. is a general purpose sulphonamide with a wide range of antibacterial activity equally suitable for the control of gram-positive and gram-negative organism infection. This preparation is now also available as tablets of sulphadimidine B.Vet.C., and in powder form.

Metropolitan Vickers Electrical Co. Ltd.

1. *Newton-Victor K-5 Portable X-ray Unit*

This portable X-ray apparatus is deservedly popular among veterinary surgeons because, although so compact and convenient, it is powerful enough to provide excellent radiography of the entire body-structure of small animals. With it, diagnostic X-ray service is immediately at hand in the surgery and dispensary, field, or patient's home. The unit is 100 per cent. electrically safe. All high-voltage parts, including the X-ray tube, are immersed in oil within an hermetically sealed metal container—a shock-proofing construction principle pioneered by Newton Victor many years ago and to-day standard practice in the design of medical and industrial X-ray installations operating at many hundreds of thousands of volts.

2. *Newton-Victor ST-15 Mobile Tubestand*

This tubestand, when assembled with the K-5 unit, provides a thoroughly practical mobile X-ray equipment. It can be conveniently placed alongside any examination desk or table and operated over its entire length with excellent flexibility in positioning and angulation. There is complete horizontal rotation of the X-ray tubehead, plus 240° vertical rotation. In addition, the tubehead has a crosswise range of 13½ in. (34.3 cm.) along its supporting cross-arm. The 69 in. (175.3 cm.) height of the tube-column affords ample focal-film distance for radiography above the table-top, and the tubehead carriage can be locked rigidly in position for the X-ray exposure.

Raising and lowering the tube carriage and head is effected by means of a crank gear mechanism and is self-retaining in all positions.

3. *A Selection of Newton-Victor X-ray Accessories and Supplies*

The selection will include the Newton-Victor Maxilume Radiograph Illuminator. This utilises correct north daylight fluorescent light, greatly facilitating diagnosis and providing comfortable viewing with absence of eyestrain. It is specially designed to ensure even distribution of light over the entire viewing area up to 14 in. × 17 in. (35.6 cm. × 43.2 cm.) and is obtainable with or without dimming circuit.

Parke, Davis & Co. Ltd.

The "P.D." stand displays a comprehensive range of Chloromycetin products for use in both large- and small-animal practice.

The versatile nature of Chloromycetin Tincture 10 per cent. has made this product a firm favourite with the veterinary surgeon both as a specific for the treatment of foot-rot and foul-of-the-foot, and also in such conditions as contagious pustular dermatitis, blackspot, venereal granulomata, and as an antiseptic for spraying onto wounds, deep traumatic lesions, fistulae, etc.

XUM

Our recently introduced product, Intramycetin, presents Chloromycetin as a 15 per cent. aqueous suspension, having a stability period of 1½ years. Each 10-ml. vial contains 1½ grammes Chloromycetin, and represents parenteral broad-spectrum antibiotic therapy at its cheapest and best.

The value of Mascetin in mastitis is becoming increasingly appreciated, especially in cases which are penicillin resistant.

Other well-known products will be featured, but may we take this opportunity of welcoming you to our stand, where we shall be pleased to give you full information on our products designed for use in veterinary medicine.

Petfoods Limited

Petfoods Limited, who are manufacturers of packaged foods for pets, will display their full range of canned foods for dogs (Chappie, Lassie, Pal-Meet), cats (Kit-E-Kat), and the latest addition to their range, Trill, packaged seed for budgerigars. The theme of the stand will be "balanced diets" which, coupled with high taste acceptance, is a feature of these packs.

Pfizer Ltd.

Pfizer veterinary products featured this year include parenteral, oral, and topical forms of the broad-spectrum antibiotic Terramycin (oxytetracycline), and the steroids Deltacortril (prednisolone) and Cortril (hydrocortisone).

The newly announced Terramycin injectable solution provides a clear liquid preparation of Terramycin in stable, "sterile," multi-dose packs, suitable for general parenteral administration in large and small animals. The concentration facilitates the injection of therapeutic doses in a conveniently small bulk.

The preparation is the outcome of work carried out in collaboration between investigators in this country and the United States. It provides immediate treatment for primary and secondary infections encountered in veterinary practice.

Another new formulation is Terramycin Intramammary Animal Formula, containing Terramycin in solution. The tube ensures ease of administration coupled with protection of the contents from contamination under field conditions. The material is stable and readily diffusible in the udder.

The topical and oral forms of Terramycin are represented in their many applications to pathological conditions encountered in animals.

Terramycin suspension in oil, an injection specially formulated to give prolonged activity in poultry, has proved its value in avian disease syndromes.

Deltacortril (prednisolone) intramuscular suspension of proven value in ketosis and inflammatory conditions is showing benefit in an ever-increasing number of other syndromes with or without the complementary use of broad-spectrum antibiotics.

Local and oral preparations of Cortril (hydrocortisone) exhibited are effective in many specific and non-specific skin irritations, ocular inflammation, arthritis, and sprains.

Smith Kline & French Laboratories Ltd.

The Veterinary Division of Smith Kline & French Laboratories Ltd. will be exhibiting on stand number 7 at this year's B.V.A. Congress. The stand will feature Bifuran and Neftin, products of the Nitrofuran group of compounds. The Nitrofurans are a new and distinct group of chemotherapeutic agents which are making an increasing contribution to both human and animal medicine.

Bifuran, combining nitrofurazone and furazolidone, is effective in curative and preventive treatment of both caecal and intestinal coccidiosis in poultry. It is also an effective method of preventing and treating necrotic enteritis, paratyphoid, and coccidiosis in pigs. There are two presentations of the product: Bifuran Supplement for mixing in the feed, and Bifuran Soluble Tablets for administration in the drinking water.

Neftin, furazolidone, is a nitrofuran with a wide range of action against bacteria and protozoa. It controls fowl typhoid, pullorum disease, blackhead, salmonellosis, hexamitiasis, coli septicaemia, and synovitis.

Both Bifuran and Neftin have the additional advantages of controlling many non-specific secondary infections and of improving growth and feed conversion.

Technical literature and material for clinical trial will be available, and representatives of the SKF Veterinary Division will be in attendance to welcome visitors to the stand.

William R. Warner & Co. Ltd.

Pacatal is a drug of the phenothiazine series which has been used extensively in human medicine to modify the hostile, aggressive, destructive behaviour of psychotic patients without sedating them to the point where they cannot look after themselves; as a premedication, to produce a patient who is alert and co-operative in the hours preceding surgery yet also relaxed and unapprehensive; to avoid or control post-operative vomiting (it is a powerful anti-emetic); to modify the outrageous behaviour, and particularly the incontinence, of senile patients.

Essentially, Pacatal induces a calm, relaxed, but still alert, attitude in patients who would otherwise show tension, fear, hysteria, and the associated extremes of behaviour.

The use of Pacatal Veterinary in animals, while it has progressed well beyond the clinical trial stage, must still be regarded as a new development.

It has been used predominantly for the dog to produce an animal which will submit placidly to handling. Boarders treated for a day or two with Pacatal accept their new environment without evident distress. Car sickness in dogs is well controlled with Pacatal. It has often been employed as the only medicament in minor surgery where it has the advantage of avoiding the "recovery period" normally necessary after an anaesthetic.

Pacatal is valuable as a means of securing a calm, unapprehensive animal for transport and perhaps special mention should be made of horses being sent by air to other parts of the world.

Pacatal is extensively used in some countries to minimise the loss of weight suffered by cattle in transit.

Willows Francis Ltd.

The centre feature of the stand is an illuminated reminder of the comprehensive service offered exclusively to the profession.

An important announcement of the recent appointment of Willows as sole distributors of the veterinary products of Geigy Pharmaceutical Co. is given prominence on a side panel. Geigy—pioneers in chemotherapeutic research—have developed many noteworthy products which, through this association of two of the oldest houses in the chemical and pharmaceutical fields, will be freely available to the profession.

The complementary panel details a number of Willows well-established veterinary specialities, *e.g.*:—

Vioxel, the ear and eye ointment containing neomycin and nitrofurazone; Kebovel, a product embodying propionate therapy in the treatment of ketosis; Neo-Sulphentrin, combining mixed sulphonamides and detoxicants with neomycin and streptomycin in tablet form, for the effective treatment and control of infectious enteritis in all species; Neovagon, a veterinary uterine pessary, non-irritating and non-toxic, for uterine hygiene and retained placenta; Xylotox veterinary, the renowned self-sterilising local anaesthetic.

Several new products will be featured and should arouse great interest: Tranquisan, a sedative and tranquilliser for large- and small-animal use; Bioderma, an antibacterial and anti-inflammatory topical application, based on the established neomycin and nitrofurazone synergism with Cu-Na-chlorophyllin and cod-liver oil for infected and inflamed wounds, dermatologic conditions (skin, nose, external ear); Dovax, freeze-dried, egg-adapted (living) distemper and hard pad vaccine.

The new "Wilstone" T.T. syringe designed to ensure uniformity in siting of injection, plus accuracy of dose, eliminates the risk of injecting either avian or bovine in the wrong site, greatly reduces disturbance to the animal and, most important to the busy clinician, it affords a considerable reduction of time.

In addition a full range of veterinary instruments will be displayed and literature and samples of many of the products will be made available to all the members of the profession who visit the stand.